RFC 8-RC

REPEATER CONTROLLER

INSTRUCTION MANUAL

RF CONCEPTS
Division of Kantronics

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rfconcepts

addr1 2FF0
2 2FE0

The unique unlock code for your RFC 8-RC is ~~780950101~~ 0540(6704

This number should be written on pages 5-1 and A-1 in this manual.

This number is also used as the serial number.

Please fill out and return the enclosed warranty card. This will insure proper registration of your unit.

FACTORY: 8911-A MURRAY AVENUE • GILROY, CA 95020 U.S.A. • 408-847-7373
MARKETING: 2000 HUMBOLDT STREET • RENO, NV 89509 U.S.A. • 702-827-0133
TELEX: 4993999 EGELECTR

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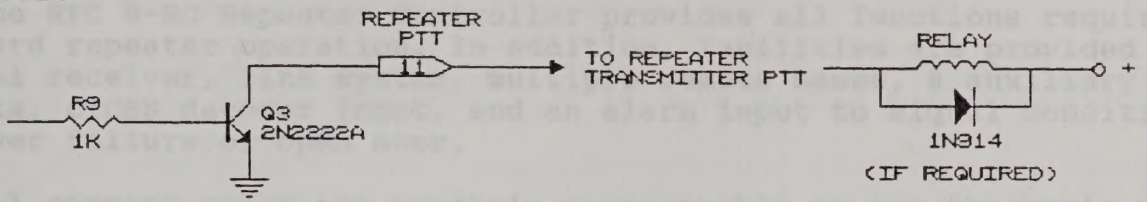
WARNING: This product contains static sensitive components. Take proper precautions to prevent static buildup while handling.

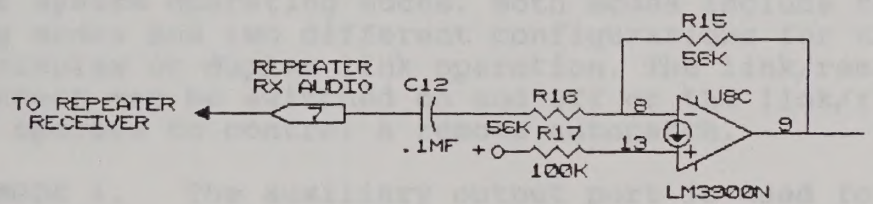
PTT (Push-to-Talk)

This signal is an output from the RFC 8-RC to turn on the repeater transmitter. The RFC 8-RC controller provides a solid-state closure to ground. This output can sink up to 100 mA when on and withstand 30 volts DC when off. If your transmitter has different requirements than those above the PTT output can be used to drive a relay to switch the transmitter on and off. If your transmitter is switched by a relay be sure to install a diode across the relay coil to prevent damage to the driver transistor.



RECEIVER AUDIO

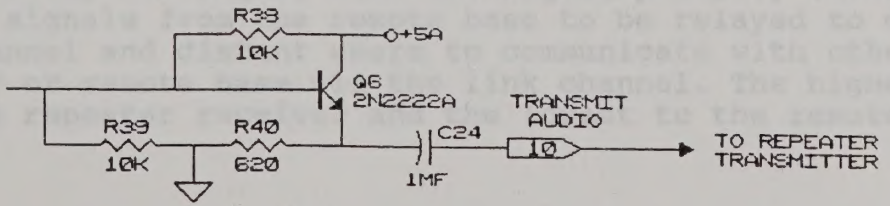
Audio needs to be supplied by the repeater receiver to the RFC 8-RC controller. This audio should be de-emphasized and after the squelch gate. The level required by the controller is -10 dbm (.25v RMS) with a 3 KHz deviated signal into the receiver. The input circuitry is capacitive coupled with an impedance greater than 50K ohms so there should not be any problem with loading.

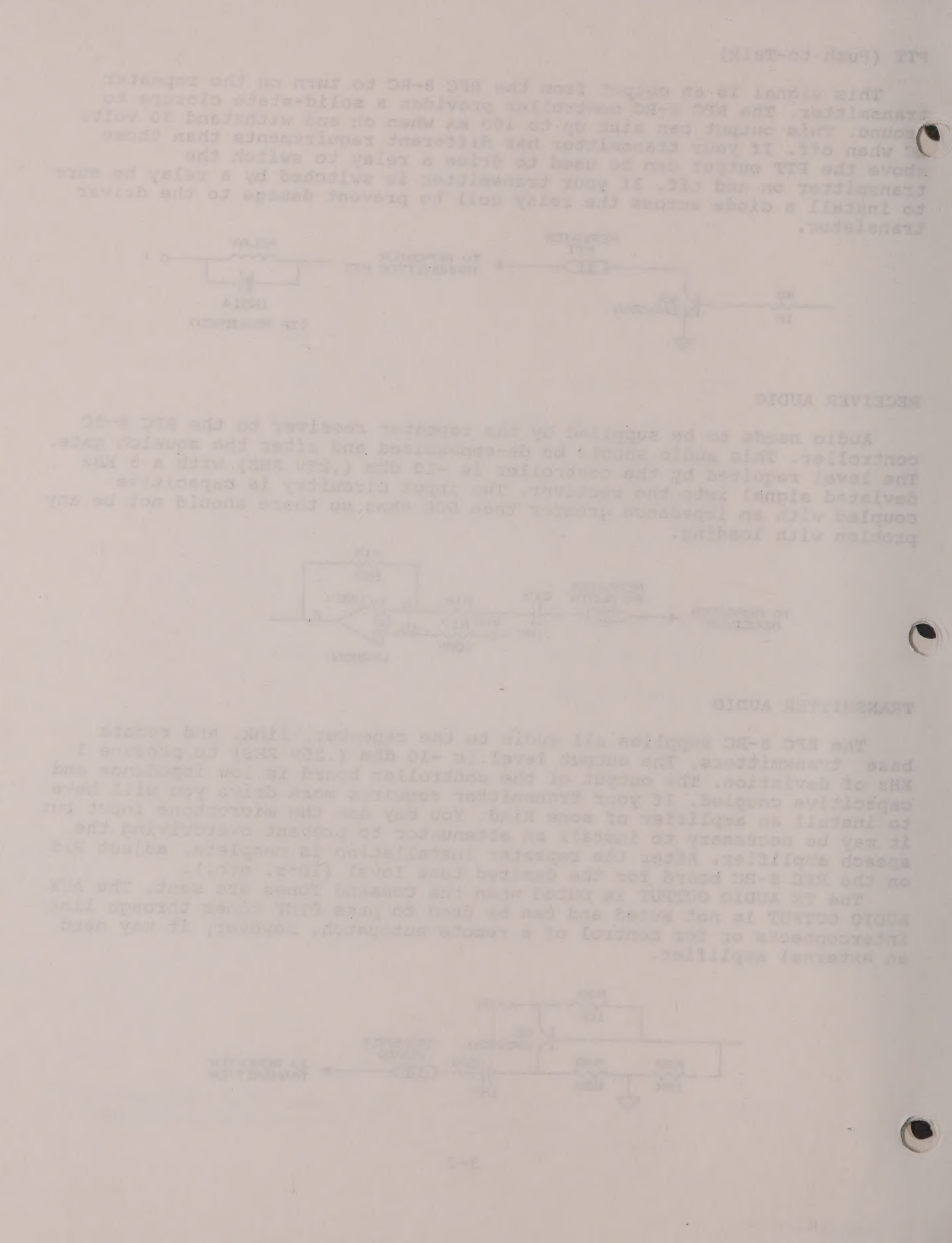


TRANSMITTER AUDIO

The RFC 8-RC supplies all audio to the repeater, link. and remote base transmitters. The output level is -10 dbm (.25v RMS) to produce 3 KHz of deviation. The output of the controller board is low impedance and capacitive coupled. If your transmitter requires more drive you will have to install an amplifier of some kind. You may use the microphone input but it may be necessary to install an attenuator to prevent overdriving the speech amplifier. After the repeater installation is complete, adjust R15 on the RFC 8-RC board for the desired tone level (ID's. etc.).

The TX AUDIO OUTPUT is muted when the Command Tones are sent. The AUX AUDIO OUTPUT is not muted and can be used to pass DTMF tones through link interconnects or for control of a remote autopatch. However, it may need an external amplifier.





The RF Concepts RFC 8-RC Repeater Controller represents a different approach to repeater control. The RFC 8-RC was designed with emphasis placed on being a very flexible and powerful workhorse instead of providing fancy 'Bells and Whistles'. The result is a control system that can be expanded to handle all the requirements of large, multiple-site, interconnected systems as well as the simple repeater. The operation of the RFC 8-RC is straight forward and totally transparent to the everyday user.

The RFC 8-RC Repeater Controller provides all functions required for standard repeater operation. In addition, facilities are provided for a control receiver, link system, multiple remote bases, 8 auxiliary on/off outputs, CTCSS decoder input, and an alarm input to signal conditions such as power failure or open door.

All command codes are remotely programmable as are the various timers, tone pitches, and the ID message. All data is stored in non-volatile EEPROM so battery backup is not required to maintain operating parameters in case of power failure. All commands to the controller are verified with a CW message. The controller may be used as a basic repeater control system or may be the heart of a super system with a multi-channel link, multiple synthesized remote bases and autopatch with the addition of various optional accessories.

To allow for different applications the RFC 8-RC provides two different system operating modes. Both modes include ten user programmable operating modes and two different configurations for the link channel as well as simplex or duplex link operation. The link/remote base cross-connect may be switched on and off or the link/remote base may be setup to operate to control a remote autopatch.

SYSTEM MODE 1. The auxiliary output port is used for direct on/off control of up to eight external functions. In this mode there are no facilities for an autopatch or changing link or remote base frequencies.

SYSTEM MODE 2. The RFC 8-RC provides support for the RFC 8-AP Autopatch, RFC 8-RP Remote Autopatch Interface, up to eight RFC 8-RB Remote Base Interfaces, RFC 8-LI Link Interface Board, RFC 8-AX Auxiliary Expansion, and the RFC 8-PK Packet Interface which allows control via packet with installation of an external TNC and transceiver. When using SYSTEM MODE 2 the RFC 8-RC provides ten memory channels to store information for a synthesized remote base. Each memory channel contains the remote base #, frequency, offset and sub-audible tone, if any.

The repeater, link, and remote base receiver inputs are arranged in a priority scheme that allows each input to be repeated out the other two. If a signal arrives on an input with a higher priority than the one currently active, the signal with the higher priority takes precedence. This allows signals from the remote base to be relayed to distant users on the link channel and distant users to communicate with others on either the repeater or remote base via the link channel. The highest priority is given to the repeater receiver and the lowest to the remote base receiver.

Listed below are options that will be available:

The RFC 8-AP will provide a complete autopatch including the ability to control the RFC 8-RC via the telephone line as well as reverse autopatch capability. The RFC 8-AP regenerates all DTMF tones and has an autodial memory that will hold 100 different telephone numbers as well as a last number redial feature. An activity timer which may be switched on or off and a method to restrict calls to the local calling area are also provided. The RFC 8-AP also contains the circuitry to decode the 8 Aux Outputs and the Channel Select Outputs for the link radio.

The RFC 8-RP provides the interface circuitry to allow transparent and automated access to an autopatch not located at the repeater site.

The RFC 8-RB Remote Base Interface contains circuitry to interface the RFC 8-RC to many different types of synthesized transceivers. It also contains a remotely programmable CTCSS encoder. The RFC 8-RB may be used for control of equipment connected to either the link or remote base port of the RFC 8-RC.

The RFC 8-AX Auxiliary Expansion Interface increases the number of auxiliary on/off outputs from eight to forty. It allows each group of eight outputs to configured with a single command and two eight bit ports may be configured to drive external CTCSS encoder/decoders.

The RFC 8-PK packet interface provides a communications link between the RFC 8-RC controller and an external TNC. This will allow control of the RFC 8-RC via a packet radio link.

The RFC 8-SI Serial Interface can be used to decode either the Link Channels or the Aux Outputs.

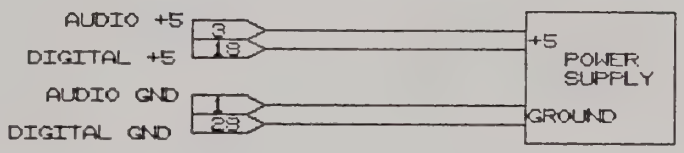
SPECIFICATIONS

Audio Input Level	-10 dbm at 3 KHz Deviation (.25v RMS)
Input Impedance	Greater than 50K ohms
Audio Output Level	-10 dbm for 3 KHz Deviation (.25v RMS)
COS Inputs	CMOS Buffered - Active Low
Alarm Input	TTL - Active Low
CTCSS Decoder Input	CMOS Buffered - Active High
PTT Outputs	Open-collector Transistor - Active Low will sink 30 VDC at 100 mA
Aux/Expansion Port	Eight bits - Open collector/Active Low
Hang Delay Timers	Programmable from .05 to 4.0 Seconds
Time-out Timers	Programmable from .5 to 3.0 Minutes
Tone Frequencies	Programmable from 400 to 3000 Hz
CW Speed	Programmable from 10 to 30 WPM
User Programmed Operating Modes	Ten
Links	One (Up to eight channels with RFC 8-AP or RFC 8-SI)
Remote Bases	One (Up to eight with RFC 8-RB)
Microprocessor	8085A (1.6 MHz)
Memory	16384 Bytes ROM 8192 Bytes NOVRAM 256 Bytes RAM
Power Requirements	5 Volts D.C. at less than 300 mA
Size	4.5 X 6.5 Inches
Connector	36/72 Pin X .100 Spacing

In addition to power, four other connections are required for basic repeater operation. Two signals from the repeater receiver and two from the repeater transmitter.

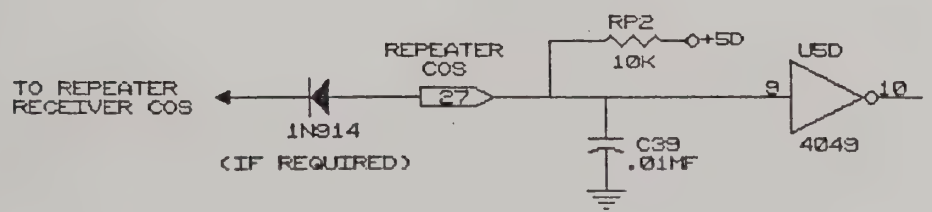
POWER SUPPLY

The RFC 8-RC requires a power supply of 5 volts DC (+/-.25V) at 300 mA. This may be obtained from the repeater or a separate supply. The RFC 8-RC has several terminals for power and ground. These should be connected together ONLY at the power supply to prevent digital noise from appearing on the audio line.



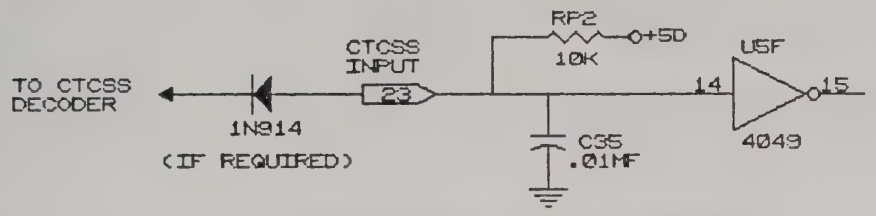
COS (Carrier-Operated-Switch)

This is a signal from the repeater receiver that indicates there is a signal present. This signal is present in most receivers designed for repeater service. If your receiver does not have a COS output you will have to provide one. The place to look is at the noise detector part of the squelch circuit or at the audio switch. The RFC 8-RC requires a COS signal that goes to ground when the receiver is active. This may be an open collector type output, preferred, or a logic type output. If this output has any voltage present during receiver inactivity a diode will be required for isolation as shown in the example below.



CTCSS DECODER

The RFC 8-RC provides an input for a CTCSS Decoder. If this input is used, it needs to be held low (ground) when the proper CTCSS tone is <u>not</u> present. When the tone is present, the decoder output needs to switch to either a high impedance condition (open-collector output) or to +5 volts (TTL/CMOS logic output).



COMMANDING THE CONTROLLER

Commands for the RFC 8-RC are divided into three groups. These groups are arranged to provide different levels of security for your control codes. The first group is the Setup Command Group. These are the commands for programming the timers, command prefixes, ID message, etc..

The second group is the Control Operator Command Group. These are the commands to select operating modes and to enable or disable operating parameters.

The third group is the User Command Group. These include functioning the Link, Remote Base, Auxiliary Functions, Autopatch, etc..

The Control Operator and User Commands all have the same format.

PREFIX CODE followed by a COMMAND CODE

XXXX - XXXXX

1 to 4 digits - 1 to 5 digits

Commands may be entered through the repeater or control receiver. When the control receiver COS is active, control will not be allowed through the repeater receiver. Commands entered through the repeater receiver will be acknowledged in CW. Commands entered through the control receiver port will not be acknowledged unless enabled by the Auxiliary Control Command. Activation of the control receiver will erase any commands being entered on the repeater receiver. The RFC 8-RC normally evaluates tone entries upon squelch closure. However, you may force evaluation by ending your command string with the "#" . This will cause immediate command evaluation and will not generate a CW response unless the Auxiliary Control function is enabled.

There are several other conditions concerning command entry. Once you begin entering a command you must complete it within 15 seconds. The only exception is when programming the ID message. When programming the Command Prefixes you must begin entering the new prefix within 10 seconds after entering the "Set Prefix" commands or you will have to start over.

SYSTEM DEFAULTS

The RFC 8-RC comes with a series of default (preset) Prefixes, Functions, and Tones. These defaults are listed on page B-1. Any or all of these defaults may be changed using the Setup procedure.

TIME-OUT TIMER

This timer is used to turn the system off in the event a steady signal remains on any of the system inputs excluding the control receiver. The time-out timer may be enabled or disabled separately for the repeater, link, or remote base inputs. If the courtesy tone is enabled, the time-out timer will reset on the tone otherwise it is reset when the input signal disappears or the controller switches to a different receiver input. When a time-out is ready to occur a warning tone will be transmitted on the active transmitters to warn listeners of the impending time-out. If a time-out occurs, the time-out timer will reset when the input signal disappears for 1/2 second. The duration of this timer is programmable from 30 sec. to 3 min. in 30 second increments.

ID'er

The RFC 8-RC is set to ID every 6 minutes. The first ID is sent at the end of the first transmission. If there is continued activity the ID will be sent at the end of the first transmission after the 6 minute interval has expired. If this transmission lasts beyond 6 minutes, to 9 minutes, the repeater will "Time Out" and identify.

If there is no activity the ID'er resets and an ID will not occur until the end of the next transmission.

COURTESY TONE

When the courtesy tone system is enabled, a beep will be sent 600 ms after the squelch closes. A different tone pitch may be selected for the repeater, link, and remote base inputs to signal users which receiver the signal came through. The time-out timer is reset on the beep. If the courtesy tone system is disabled the time-out timer will reset immediately on squelch closure or if the controller switches to a different receiver input. There will be no courtesy tone if the hang time for that particular receiver is set to less than 1.5 second.

PRIVACY TONE

When this mode is enabled a pulsing tone will be generated while commands are being entered through the repeater receiver. This provides for security of your control codes and a pleasant tone that will not bother listeners.

KERCHUNK AND NOISE FILTERING

The kerchunk filter will immediately drop the transmitter upon squelch closure on any transmissions less than 500 ms in length. Also provided is a delayed PTT which filters against noise pulses on the COS inputs. The PTT lines will not be activated until a signal has been present for 60 ms.

T-P (Touch-Pad) ACCESS

When the T-P ACCESS mode is activated the user must send a turn-on code from a Touch-Tone(*) pad to active the Repeater. The Repeater will then operate in a normal manner. When activity stops, the repeater will reset to T-P ACCESS. The time it takes to reset is adjustable.

* "Touch-Tone" is a registered trademark of A.T. and T..

ACCESS (Carrier or CTCSS tone)

The RFC 8-RC has four access modes. One is "carrier access". The other three require an input from the CTCSS tone decoder in the receiver.

SETUP COMMANDS

Before any of the following SET UP COMMANDS can be used, you must enter your unique nine digit unlock code. The RFC 8-RC will respond in CW with "OK" and remain unlocked for 60 seconds. If no Setup Commands are entered for a period exceeding 60 seconds the RFC 8-RC will relock itself. After entry of any of the following commands the Setup Timer will be reset for another 60 seconds. See page A-1 for a summary of the commands.

UNLOCK CODE 054016704

Note: This code is unique to your controller and is not used on any other controller.

ID PROGRAMMING: (Default CALL/R)

To program your ID message enter '*8090', wait for the acknowledgment "ID OK" then enter the two-digit codes for the characters in the message. DO NOT enter the '/R'. This will be added automatically. If you entered a valid sequence the RFC 8-RC will read the new ID message back to you in CW.

CHARACTER CODES:

0 = 00	9 = 09	I = 18	R = 27
1 = 01	A = 10	J = 19	S = 28
2 = 02	B = 11	K = 20	T = 29
3 = 03	C = 12	L = 21	U = 30
4 = 04	D = 13	M = 22	V = 31
5 = 05	E = 14	N = 23	W = 32
6 = 06	F = 15	O = 24	X = 33
7 = 07	G = 16	P = 25	Y = 34
8 = 08	H = 17	Q = 26	Z = 35

SETTING TONES:

TONE CHART:

0 = 400 Hz	5 = 1225 Hz
1 = 500 Hz	6 = 1530 Hz
2 = 625 Hz	7 = 1910 Hz
3 = 780 Hz	8 = 2375 Hz
4 = 975 Hz	9 = 2980 Hz

ID'er TONE (Default 1225 Hz)

To set the pitch of the ID'er enter '*4560x' where 'x' = 0-9 for the desired tone from the Tone Chart. The RFC 8-RC will respond in CW with "IDT OK".

REPEATER COURTESY TONE (Default 625 Hz)

To set the pitch of the repeater courtesy tone enter '*4561x' where 'x' = 0-9 for the desired tone from the Tone Chart. The RFC 8-RC will respond in CW with "CT1 OK".

LINK COURTESY TONE (Default 780 Hz)

To set the pitch of the link courtesy tone enter '*4562x' where 'x' = 0-9 for the desired tone from the Tone Chart. The RFC 8-RC will respond in CW with "CT2 OK".

REMOTE BASE COURTESY TONE (Default 975 Hz)

To set the pitch of the remote base courtesy tone enter '*4563x' where 'x' = 0-9 for the desired tone from the Tone Chart. The RFC 8-RC will respond in CW with "CT3 OK".

COMMAND ACKNOWLEDGMENT TONE (Default 1910 Hz)

To set the pitch of the acknowledgment tone enter '*4564x' where 'x' = 0-9 for the desired tone frequency from the Tone Chart. The RFC 8-RC will respond in CW with "ACK OK".

PRIVACY TONE (Default 400 Hz)

To set the pitch of the privacy tone enter '*4565x' where 'x' = 0-9 for the desired tone from the Tone Chart. The RFC 8-RC will respond in CW with "PT OK".

SETTING HANG TIMES:

HANG TIME CHART:

0 = .05 Sec	5 = 2.0 Sec
1 = .25 Sec	6 = 2.5 Sec
2 = .50 Sec	7 = 3.0 Sec
3 = 1.00 Sec	8 = 3.5 Sec
4 = 1.50 Sec	9 = 4.0 Sec

(NOTE: Hang times shorter than 1.5 second will not generate a courtesy tone.)

REPEATER HANG TIME (Default 1.5 sec.)

To set the repeater hang time enter '*7410x' where 'x' = 0-9 for the desired delay time from the Hang Time Chart. The RFC 8-RC will respond in CW with "HT OK".

LINK HANG TIME (Default 1.5 sec.)

To set the link hang time enter '*7411x' where 'x' = 0-9 for the desired delay time from the Hang Time Chart. The RFC 8-RC will respond in CW with "LT OK".

REMOTE BASE HANG TIME (Default 1.5 sec.)

To set the remote base hang time enter '*7412x' where 'x' = 0-9 for the desired delay time from the Hang Time Chart. The RFC 8-RC will respond in CW with "RT OK".

SETTING TIME-OUT TIMERS:

TIME-OUT CHART:		
	0 = .5 Min	3 = 2.0 Min
	1 = 1.0 Min	4 = 2.5 Min
	2 = 1.5 Min	5 = 3.0 Min

TIME-OUT TIMER (Default 3 min.)

This command is used to set the length of the time-out timer. To set this timer enter '*7413x' where 'x' = 0-5 for the desired time from the Time-out Chart. The RFC 8-RC will respond in CW with "TO OK".

T-P (Touch Pad) ACCESS TIME-OUT TIMER (Default 1 min.)

This command is used to set the length of time the repeater will remain enabled without activity when the T-P Access Mode is enabled. To set this timer enter '*7414x' where 'x' = 0-5 for the desired time from the Time-out Chart. The RFC 8-RC will respond in CW with "ATO OK".

AUTOPATCH ACTIVITY TIMER (Default 1 min.)

To set the timer enter '*7415x' where 'x' = 0-5 for the desired time from the Time-out Chart. The RFC 8-RC will respond in CW with "APTO OK". This command affects both the on-site and remote autopatch.

SETTING CW SPEEDS:

SPEED CHART:		
	0 = 10 WPM	3 = 25 WPM
	1 = 15 WPM	4 = 30 WPM
	2 = 20 WPM	

ID SPEED (Default 20 WPM)

To set the ID speed enter '*7416x' where 'x' = 0-4 for the desired speed from the Speed Chart. The RFC 8-RC will respond in CW with "IS OK".

(NOTE: ID's are limited to 20 WPM. See FCC Rules Part 97.84.)

COMMAND ACKNOWLEDGMENT SPEED (Default 20 WPM)

To set the speed of the command acknowledgments enter '*7417x' where 'x' = 0-4 for the desired speed from the Speed Chart. The RFC 8-RC will respond in CW with "AS OK".

LINK TIMING (Default Simplex)

This command selects the timing parameters for a simplex or duplex link channel. For simplex operation enter '*74180'. For duplex operation enter '*74181'. The controller will respond in CW with "LNK".

ID TIMING (Default-No delay)

This command is used to delay the ID by 10 seconds when the system is connected to another repeater via the link or remote base channels. The purpose of this is to prevent both repeaters from identifying simultaneously when first keyed up. For normal operation enter '*74190'. For delayed operation enter '*74191'. The controller will respond with "IDI".

COMMAND PREFIXES

To set the command prefixes enter the code for the desired prefix, unkey, wait for acknowledgment, then enter the new prefix. Prefixes must be from one to four digits in length and must NOT contain the sequence 'AC' nor may they contain the '#' except as the first digit. If the new prefix is not entered within ten seconds you will have to start over. Be sure you don't duplicate prefixes.

CODE	RESPONSE	PURPOSE	DEFAULT
<u>System MODE 1 Commands</u>:			
*40900	MID OK	Set Manual ID Code	54
*40901	RPT OK	Set Repeater Command Prefix	2587
*40902	LNK OK	Set Link Command Prefix	321
*40903	RMT OK	Set Remote Base Command Prefix	654
*40904	AUX OK	Set Auxiliary Control Command Prefix	47
*40905	COP OK	Set Control Operator Command Prefix	852
*40906	TP OK	Set TT Access Command Prefix	55
*40907	PS OK	Set Preset Mode Prefix	08
<u>System MODE 2 Commands</u>:			
*40908	PA OK	Set Autopatch Access Code	*841
*40909	PD OK	Set Autopatch Disconnect Code	#8
*40910	RPA OK	Set Remote Autopatch Access Code	*89
*40911	RPD OK	Set Remote Autopatch Disconnect Code	#9
*40912	AD OK	Set Autopatch Autodial Prefix	*
*40913	OL OK	Set Dialing Prefix	-
*40914	CH OK	Set Channel Select Prefix	82
*40915	CK OK	Set Remote Base Freq. Check Code	36
*40916	RBF OK	Set Remote Base Freq. Command Prefix	58
*40917	MEM OK	Set Memory Command Prefix	14
*40918	ST OK	Set CTCSS Prefix	21
*40919	RBS OK	Set Remote Base Select Prefix	53

PRESET PARAMETERS

You have the ability to setup three preset modes of operation. To load the operating parameters for a particular operating mode, setup the repeater, link, remote base, auxiliary outputs, timers, tone pitches, etc. the way you want for that mode and then enter '*489x' where x = 0-9 for the desired mode to store the preset mode in memory. After the Presets are loaded, all you need do is enter one command to change the system configuration for a particular type of operation.
NOTE: Preset #0 is used by the Remote Autopatch System.

SYSTEM OPERATING MODE (Default MODE 1)

For MODE 1 operation of the RFC 8-RC enter '*8101'. The controller will respond with "MD 1 OK". For Extended operation, MODE 2, with the optional accessory boards enter '*8102'. The RFC 8-RC will respond with "MD 2 OK". When powered up, the RFC 8-RC normally checks for each optional accessory and selects the correct mode.

NOTE: The following commands require the RFC 8-RC to be in MODE 2.

NOTE: This command requires least one RFC 8-RB Remote Base Board.

MEMORY SET - System MODE 2

This command is used to store the current remote base #, frequency, offset and sub-audible tone into one of the ten memory channels. To program a channel enter '*963x' where 'x' = 0-9 for the desired channel. The current remote base #, frequency, offset and sub-audible tone, if any, will be stored in the desired memory channel. The RFC 8-RC will respond in CW with "M #" where '#' is the channel number (0-9).

AUTODIAL NUMBERS - System MODE 2

NOTE: These commands requires the presence of the RFC 8-AP Autopatch.

To program the telephone numbers in the autodial memory, enter '*586xx' where 'xx' = 00 to 99 for the particular memory you wish to program. The controller will respond with "AD xx OK". After the acknowledgment enter the complete telephone number. If the number has been accepted the RFC 8-RC will respond with 'dit-dit'.

DIALING PREFIX - System MODE 2

This command is used to enter a dialing prefix which is added to the beginning of all phone numbers entered manually or resident in the autodial memory. This feature is useful if your telephone line requires an entry to access an outside line. It will also allow four digit dialing if all phone numbers in your area contain the same prefix. To enter a dialing prefix, enter '*40913'. The controller will respond with "OL OK". After the acknowledgment, enter the desired dialing prefix. If you do not wish to have a dialing prefix, enter '*' instead of a numerical prefix.

REMOTE AUTOPATCH

The RFC 8-RC, with the addition of the RFC 8-RP, will automatically send the Access, Autodial, Redial, and Disconnect commands to a remote autopatch. To set the Remote Autopatch Access Code, as sent by the RFC 8-RC, enter '*40920'. After the acknowledge, "RAC OK", enter the access code. To set the Remote Autopatch Disconnect Code, as sent by the RFC 8-RC, enter '*40921'. After the acknowledge, "RDC OK", enter the disconnect code. To set the Remote Autopatch Autodial Access Code, as sent by the RFC 8-RC, enter '*40922'. After the message, "RAD OK", enter the required autodial prefix. NOTE: The same conditions concerning timing of these entries are the same as setting the command prefixes.

LOCK CONTROLLER

To lock the controller enter '#*'. The RFC 8-RC will respond in CW with "LOCK".

INITIALIZE

This command should be used ONLY if the controller is not functioning properly. This command will erase all values in the EEPROM, including the ID call sign, and set them to the default values. To initialize the RFC 8-RC, enter '0', your Unlock Code, and '0'. Enter all 11 digits as one sequence. The RFC 8-RC will reload the EEPROM with the default values and restart itself. If the system has recovered the repeater should come on the air and ID. If this command does not solve the malfunction you more than likely have a hardware problem.

Control Operator Commands are made up of the Control Operator Prefix followed by a three digit code, except for the following three commands, Repeater Control, System Reset and Preset Mode commands. They have their own prefixes. Each Control Operator command is separately described below.
See page A-4 for summary of commands.

REPEATER CONTROL: (Default 2587)

On/Off

The system may be shut off by entering the Repeater Control Prefix followed by a '0'. The RFC 8-RC will respond in CW with "OFF" and immediately shut down. To activate the system, enter the Repeater Control Prefix followed by a '1'. The RFC 8-RC will respond in CW with "ON".

CTCSS Tone Access

To place the system in Tone Access, enter the Repeater Control Prefix followed by a '2'. The RFC 8-RC will respond with "TS".

DUPLEX CONTROL-LINK MODES (Carrier/Tone)

These modes are identical to normal repeater operation except the repeater transmitter will be turned OFF when there is a signal present on the repeater receiver. This type of operation is used to prevent repeater receiver audio from being repeated out the repeater transmitter or when the RFC 8-RC is used at the telephone line end of a remote autopatch link.

Duplex Control-Link Carrier Access

To enter this mode, with Carrier Access, enter the Repeater Control Prefix followed by a '3'. The RFC 8-RC will respond with "DC".

Duplex Control-Link CTCSS Tone Access

To use this mode, with Tone Access, enter the Repeater Control Prefix followed by a '4'. The controller will respond with "DC TS".

SYSTEM RESET (Default AC)

To force a hardware reset enter 'AC'. After a few seconds a hardware reset will occur. None of the previously programmed parameters will be lost

NOTE: This requires the use of 16 button Touch-Pad.

NOTE: Control Operator Prefix Default is 852

COURTESY TONE

The courtesy tone system may be turned off by entering the Control Operator Prefix followed by '000'. The RFC 8-RC will respond in CW with "CT OFF". To enable the courtesy tone system enter the Control Operator Prefix followed by '001'. The RFC 8-RC will respond in CW with "CT ON".

ALARM SYSTEM

The Alarm System, when enabled, will send "A" immediately when the receiver squelch closes to signal an alarm condition. To disable the alarm enter the Control Operator Prefix followed by '010'. The RFC 8-RC will respond in CW with "ARM OFF". To enable the alarm enter the Control Operator Prefix followed by '011'. The RFC 8-RC will respond in CW with "ARM ON".

PRIVACY TONE

This command is used to turn the Privacy Tone off and on . To turn the tone off enter the Control Operator Prefix followed by '020'. The RFC 8-RC will respond in CW with "PT OFF". To turn on the Privacy Tone enter the Control Operator Prefix followed by '021'. The RFC 8-RC will respond in CW with "PT ON".

REPEATER TIME-OUT

The repeater time-out timer may be enabled or disabled using this command. To disable the repeater time-out timer enter the Control Operator Prefix followed by '030'. The RFC 8-RC will respond in CW with "RTO OFF". To enable the repeater time-out timer enter the Control Operator Prefix followed by '031'. The RFC 8-RC will respond in CW with "RTO ON".

LINK TIME-OUT

The link time-out timer may be enabled or disabled using this command. To disable the link time-out timer enter the Control Operator Prefix followed by '040'. The RFC 8-RC will respond in CW with "LTO OFF". To enable the link time-out timer enter the Control Operator Prefix followed by '041'. The RFC 8-RC will respond in CW with "LTO ON".

REMOTE BASE TIME-OUT

The remote base time-out timer may be enabled or disabled using this command. To disable the remote base time-out timer enter the Control Operator Prefix followed by '050'. The RFC 8-RC will respond in CW with "RBTO OFF". To enable the remote base time-out timer enter the Control Operator Prefix followed by '051'. The RFC 8-RC will respond in CW with "RBTO ON".

TOUCH-PAD (T-P) ACCESS MODE

This mode requires a user to enter a code from a Touch Pad to activate the system in repeater mode. The repeater will then operate in a normal manner, resetting after a period of inactivity. This mode may be used to prevent unwanted signals from activating the system. To disable this mode enter the Control Operator Prefix followed by '060'. The RFC 8-RC will respond in CW with "TP OFF". To enter this operating mode enter the Control Operator Prefix followed by '061'. The RFC 8-RC will respond in CW with "TP ON".
NOTE: Only access through the repeater receiver is affected.

IDENTIFIER

This command is used to enable or disable the ID'er. To turn off the ID'er enter the Control Operator Prefix followed by '070'. The RFC 8-RC will respond in CW with "ID 0". To enable the ID'er, repeater transmitter only, enter the Control Operator Prefix followed by '071'. The RFC 8-RC will respond in CW with "ID 1". To allow the ID'er to activate the link transmitter, if enabled, enter the Control Operator Prefix followed by '072'. The RFC 8-RC will respond with "ID 2". To allow the ID'er to activate the remote base transmitter, if enabled, enter the Control Operator Prefix followed by '073'. The controller will respond with "ID 3". To allow the ID'er to activate the link and remote base transmitters, if enabled, enter the Control Operator Prefix followed by '074'. The RFC 8-RC will respond with "ID 4".

USER COMMANDS

This command is used to enable or disable the User Commands.
To disable the User Commands enter the Control Operator Prefix followed by '080'. The RFC 8-RC will respond in CW with "USR OFF". To enable the User Commands enter the Control Operator Prefix followed by '081'. The RFC 8-RC will respond in CW with "USR ON".

LINK CONFIGURATION

This command is used to select one of two configurations for the link channel.

Option #1 will not allow the link and remote base to be cross-connected. The link and remote base will be accessible only through the repeater receiver. This option is selected by entering the Control Operator Prefix followed by '090'. The controller will respond in CW with "CC OFF".

Option #2 allows the link and remote base to be cross-connected. To select this option enter the Control Operator Prefix followed by '091'. The controller will respond in CW with "CC ON".

NOTE: If the link or the remote base is connected to a repeater that has a hang time delay and both the link and remote base radios are simplex, this mode is not recommended.

ACCESS (Carrier or CTCSS Tone)

This command is used to select one of four access modes for commanding the controller.

Access Mode #1 allows Carrier Access for all commands. Select this mode by entering the Control Operator Prefix followed by '101'. The RFC 8-RC will respond with "AM 1".

NOTE:The following requires a CTCSS control signal from the repeater receiver.

Access Mode #2 requires the presence of a CTCSS Tone in order to access any of the Setup Commands. Select this mode by entering the Control Operator Prefix followed by '102'. The RFC 8-RC will respond with "AM 2".

Access Mode #3 requires the presence of a CTCSS Tone in order to access any of the Setup or Control Operator Commands. To select this mode, enter the Control Operator Prefix followed by '103'. The controller will respond with "AM 3".

Access Mode #4 requires the presence of a CTCSS Tone to access any of the commands. To select this mode, enter the Control Operator Prefix followed by '104'. The RFC 8-RC will respond with "AM 4".

LINK ACCESS

This command is used to set the Link Access to Carrier or CTCSS tone. For Carrier access to the link transmitter, enter the Control Operator Prefix Followed by '110'. The RFC 8-RC will respond with "LTA OFF". For CTCSS tone to access the link transmitter, enter the Control Operators Prefix followed by '111'. The RFC 8-RC will respond with "LTA ON"

REMOTE BASE ACCESS

This command is used to set the Remote Base Access to Carrier or CTCSS tone.
For Carrier access to the Remote Base transmitter, enter the Control Operator Prefix Followed by '120'. The RFC 8-RC will respond with "RBTA OFF". For CTCSS tone to access the Remote Base transmitter, enter the Control Operators Prefix followed by '121'. The RFC 8-RC will respond with "RBTA ON"

COMMAND ACKNOWLEDGE

This command enables or disables the CW acknowledgments. When the acknowledgments are disabled the RFC 8-RC will send "Dit-Dit" in place of the normal CW message. To disable the CW messages enter the Control Operator Prefix followed by '130'. The RFC 8-RC will respond in CW with "dit-dit". To enable the CW messages enter the Control Op prefix followed by '131'. The RFC 8-RC will respond in CW with "CW ON".

AUXILIARY CONTROL

This command is used to allow the RFC 8-RC to activate the link and/or remote base transmitters during command acknowledgments when commands are being entered via the control receiver input. This is useful when the system is being controlled via a link from a distant system. To disable this function, enter the Control Operator Prefix followed by '140'. The controller will respond with "AXK 0". To send acknowledgments out the link transmitter, enter the Control Operator Prefix followed by '141'. The RFC 8-RC will respond with "AXK 1". To send acknowledgments out the remote base transmitter, enter the Control Operator Prefix followed by '142'. The RFC 8-RC will respond with "AXK 2". To send acknowledgments out the link and remote base transmitters, enter the Control Operator Prefix followed by '143'. The controller will respond with "AXK 3".

NOTE: The following commands require the RFC 8-AP Autopatch.

AUTOPATCH ENABLE - System MODE 2

This command will enable or disable the User Autopatch Access. To disable access enter the Control Operator prefix followed by '150'. The RFC 8-RC will respond in CW with "AP OFF". To allow access enter the Control Operator prefix followed by '151'. The RFC 8-RC will respond in CW with "AP ON". To allow access only when a CTCSS Tone is present, enter the Control Operator Prefix followed by '152'. The RFC 8-RC will respond with "AP TA".

NOTE: This command has no effect on the RFC 8-RP.

AUTOPATCH-CONTROL OP ACCESS - System MODE 2

This command will allow the control operators to access the autopatch even if the patch is disabled. This command may also be used to check the telephone line for dial tone as it will not be heard at the beginning of normal autopatch operation. For access enter the Control Operator Prefix followed by '161'. The controller will respond with "OH" and connect to the phone line. To disconnect the patch, enter the Patch Disconnect Code. The RFC 8-RC will respond with "DN".

NOTE: This command has no effect on the RFC 8-RP.

AUTOPATCH ACTIVITY TIMER - System MODE 2

This command is used to enable or disable the autopatch activity timer. To disable the timer enter the Control Operator Prefix followed by '170'. The RFC 8-RC will respond in CW with "APTO OFF". To enable the timer enter the Control Operator Prefix followed by '171'. The RFC 8-RC will respond in CW with "APTO ON".

NOTE: This command affects both the RFC 8-AP and RFC 8-RP.

TOLL CALL - System MODE 2

This command is used to restrict autopatch calls to the local calling area. To restrict calls enter the Control Operator Prefix followed by '180'. The RFC 8-RC will respond in CW with "TC OFF". To allow long distance dialing enter the Control Operator Prefix followed by '181'. The RFC 8-RC will respond in CW with "TC ON".

NOTE: This command has no affect on the RFC 8-RP.

NOTE: The following commands require the presence of the RFC 8-AP or RFC 8-RP.

PRIVATE PATCH - System MODE 2

There are three different types of operation available for the autopatch. In normal operation, all audio from the repeater receiver will be passed on to the repeater transmitter. Select this mode by entering the Control Operator Prefix followed by '190'. The RFC 8-RC will respond with "PP OFF".

Private Patch Mode #1 inhibits all audio from the repeater receiver from being passed on to the repeater transmitter. Only audio from the telephone line will be heard over the repeater transmitter. Select this mode by entering the Control Operator Prefix followed by '191'. The controller will respond with "PP ON".

Private Patch Mode #2 is the same as Mode #1 except that when the repeater receiver is active the DTMF Privacy Tone will be sent over the repeater transmitter. This mode is selected by entering the Control Operator Prefix followed by '192'. The RFC 8-RC will respond with "PPT ON".

REMOTE AUTOPATCH

This command is used to enable and disable access to a remote autopatch. To disable access, enter the Control Operator Prefix followed by '200'. The controller will respond with "RP OFF". To allow access, enter the Control Operator Prefix followed by '201'. The RFC 8-RC will respond with "RP ON".

See page A-6 for summary of commands.

MANUAL ID (Default 54)

You may manually trigger the ID'er by entering the Manual ID Command. This command will function even if the ID'er is disabled.

T-P (Touch pad) REPEATER ACCESS (Default 55)

When this mode is selected the repeater will not repeat until the T-P Access Command Prefix followed by a '1' is entered. The RFC 8-RC will respond in CW with "UP". Normal repeater operation will take place until there is no activity for a predetermined time or a user takes the system down by entering the T-P Access Command Prefix followed by a '0'. The RFC 8-RC will respond in CW with "DN" and go off the air. Note that this feature only affects access through the repeater receiver. Signals coming in on the link or remote base receivers, if enabled, will still play out through the repeater transmitter.

AUXILIARY OUTPUTS (Default 47)

These outputs are available directly when operating in MODE 1. In MODE 2 the use of these outputs requires the installation of an external decoder to recover the encoded data. To set or reset the eight auxiliary functions enter the Auxiliary Control Prefix followed by the line # (1-8) and a '0' to turn off or a '1' to turn on. The RFC 8-RC will respond in CW with "F" followed by the line #, and "OFF" or "ON".

To check the status of these outputs enter the Auxiliary Control Prefix followed by "0". The RFC 8-RC will respond in CW with a line number if that particular line is turned on. If all Aux Outputs are off, the RFC 8-RC will respond with "0".

PRESET MODES (Default 08)

To select one of the ten Preset Operating Modes enter the Preset prefix followed by '0-9'. The RFC 8-RC will respond in CW with "PS #" where "#" is the mode number and then configure the current operating parameters to the desired mode.

LINK FUNCTIONS (Default 321)

There are five link commands. Each is preceded by the Link Command Prefix. The last digit may be a '0', '1', '2', '3', or '4'. The '0', example '3210', disables the link entirely and is acknowledged in CW with "LNK OFF". The '1', example '3211', enables only the link receiver so that you may monitor the link channel but not bother users on the other end. This command is acknowledged in CW with "LNK RX". The '2', example '3212', enables only the link transmitter. This command is useful for certain types of operation and testing a path. This command is acknowledged in CW with "LNK TX". The '3', example '321', enables both the receiver and transmitter of the link allowing conversations to be passed both ways. This command is acknowledged in CW with "LNK ON". The '4', example '3214', will report on the status of the link.

When the link transmitter is enabled, a two-tone beep will be heard to notify users the link transmitter is on.

REMOTE BASE FUNCTIONS (Default 654)

If operating in MODE 1 you are limited to a single frequency remote base. Commands are the same as the link but are preceded by the Remote Base Command Prefix and the CW response will contain "RMT" in place of "LNK".

When the remote base transmitter is enabled, a two-tone beep will be heard to notify users the remote base transmitter is on.

AUTOPATCH - System MODE 2 Default: Access code *841
Disconnect code #8

To access the autopatch enter the Autopatch Access Code. If the patch is enabled the RFC 8-RC will respond in CW with "AP". After the controller sends "AP", enter the telephone number. When you unkey after entering the number, the RFC 8-RC will connect to the telephone line and redial the number with regenerated tones. You must begin dialing your number within ten seconds or the autopatch will disconnect. After you have dialed your number the autopatch timer will be set to the value programmed with the Setup Commands. This timer will reset each time you make a transmission. To shut off the autopatch enter the Autopatch Disconnect Code. The RFC 8-RC will respond with "DN" and disconnect.

REDIAL - System MODE 2 Default: Redial *841*
Disconnect #8

To redial the last number dialed on the autopatch, enter the Autopatch Access Code followed by '*'. Enter this as one command. The RFC 8-RC will respond with "RD" and automatically dial the number. Disconnecting when the call is completed is the same as normal autopatch operation.

AUTODIAL - System MODE 2 Default: Autodial Prefix *
Disconnect #8

To dial a number contained in the autodial memory enter the Autodial Prefix followed by 'xx' where 'xx = 00 - 99' for the desired memory location. The controller will respond with "AD xx" and then dial your number for you. Disconnecting when the call is completed is the same as normal autopatch operation.

REMOTE AUTOPATCH Default: Connect code *89
Disconnect code #9)

To access the remote autopatch, enter the Remote Autopatch Connect Code. The controller will send 'dit-dit' and enter the remote patch mode. To disconnect the remote patch enter the Remote Autopatch Disconnect Code. The controller will send 'dit-dit' and return to normal operation. To redial a number on the remote autopatch, enter the Remote Autopatch Access Code followed by '*'. The RFC 8-RC will access the remote autopatch and redial the last number for you. To access the autodialer on the remote autopatch, enter the Remote Autopatch Connect Code followed by '00-99' for the desired autodial location. The RFC 8-RC will send 'dit-dit' and access the remote autodialer.

CHANNEL SELECT - System MODE 2 (Default 82)

NOTE: This command requires the presence of the RFC 8-AP Autopatch or the RFC 8-SI.

In the case of a multi-channel crystal link or remote base you may select one of eight channels by entering the Channel Prefix followed by the desired channel number (1-8). The RFC 8-RC will respond in CW with "CH #" where "#" is the channel number. To check which channel is currently selected, enter the Channel Select Prefix followed by '0'. The RFC 8-RC will respond with "CH #" where "#" is the channel currently selected.

NOTE: The following commands require the presence of at least one RFC 8-RB Remote Base Interface.

REMOTE BASE FREQUENCY - System MODE 2 (Default 58)

When operating in MODE 2 you have the choice of a crystal controlled (8 channels) or a fully synthesized remote. (An external decoder is required to recover the encoded data for a crystal or synthesized remote.)

For the synthesized remote the frequency is set by entering the Frequency Set Prefix followed by the MHz, 100 KHz, 10 KHz, 1 KHz and offset. For offset, 0 = simplex, 1 = minus, and 2 = plus. The RFC 8-RC will output the new frequency and then read back the Remote Base #, Frequency, and Offset back in CW. If the CTCSS encoder is on, the Offset response will be "8", "9", or "A" instead of "0", "1", or "2".

REMOTE BASE FREQUENCY CHECK - System MODE 2 (Default 36)

To check the current frequency of the remote base enter the Frequency Check Command. The current Remote Base #, Frequency, and Offset will be read back in CW. If the CTCSS encoder is on, the Offset response will be "8", "9", or "A" instead of "0", "1", or "2".

CTCSS TONE ENCODE - System MODE 2 (Default 21)

You have the ability to select one of thirty two sub-audible tones. To program the encoder enter the CTCSS Prefix followed by two digits for desired tone (01-32). The RFC 8-RC will respond with "ST ##" where "##" is the tone number. To turn off the encoded enter the CTCSS Prefix followed by '00'. The response will be "ST OFF". To check which CTCSS tone is currently selected, enter the CTCSS Prefix followed by '0'. The RFC 8-RC will respond with "ST #" if a tone is selected or with "ST OFF" if no tone is selected.

REMOTE BASE MEMORY CHANNELS - System MODE 2 (Default 14)

The RFC 8-RC also provides for ten channels of memory for the remote base. Each memory channel contains the Remote Base #, Frequency, and CTCSS tone. To select one of these memories enter the Memory Prefix followed by the desired memory channel number (0-9). The RFC 8-RC will respond with "M #" where "#" is the memory number.

MULTIPLE REMOTE BASES - System MODE 2 (Default 53)

When you are using multiple remotes you may choose one from up to eight to be on line at any one time. To select a remote enter the Remote Base Select Prefix followed by the remote # (1-8). The RFC 8-RC will respond with "RB #" where "#" is the current remote. To check which remote base is currently selected, enter the Remote Base Select Prefix followed by '0'. The RFC 8-RC will respond with "RB #" where "#" is the remote base currently selected.

The various receiver audios go to a buffer, U8. The outputs of U8 are connected to U10. U10 is a multiplexer, it selects which of the receive audios will go to the transmitter audio output terminal and to the DTMF decoder. The output of U10 goes to the AUX OUTPUT PIN, Q2, U11, and U9C. Q2 is an FET switch which mutes transmitter audio when DTMF tones are being received. The AUX audio is not muted. U9D is the mixer for the transmitter audio. U11 is the DTMF decoder. It receives the tones and decodes them into a digital format.

The various COS inputs go to U5. U5 is an inverting buffer that isolates the COS inputs from the microprocessor circuitry.

Q3, Q4, and Q5 are the drivers for the PTT outputs. These outputs are controlled by the microprocessor to select which transmitter is turned on at any one time.

Microcomputer:

A detailed explanation of the Microcomputer is beyond the scope of this manual. Below is a brief description of the Microcomputer operation.

U1 is an 8085A microprocessor. It is the heart of the RFC 8-RC. In conjunction with U2, U3, U13, U14, and U15 form the Microcomputer that controls the operation of the RFC 8-RC.

The operating instructions (software) is factory programmed into U2. U2 is a 16K byte EPROM. The command codes and other user programmable operating parameters are stored in U3. U3 is 2K byte EEPROM which retains its memory even when the power is removed.

U3 is a multipurpose IC. Besides handling all the input and output, it contains the tone generator and 256 bytes of RAM.

U4 is used to generate sine wave tones for the RFC 8-RC. Its output goes to R15, TONE LEVEL ADJUST, then to a low pass filter,U9A, where it is filtered and then to U9D where it is mixed with the transmitter audio.

U6 and U7 are connected as a "Watchdog Timer". This timer is normally supplied with reset pulses when the RFC 8-RC is operating properly. If the RFC 8-RC malfunctions, the reset pulses will cease and the timer will begin to operate. When the terminal count is reached, U6 will force a hardware reset to the Microcomputer.

U12 is a darlington driver used as a buffer for the eight auxiliary output lines.

SUMMARY OF COMMANDS

SETUP COMMANDS

UNLOCK CODE 054016704

CODE	RESPONSE	

Programming the ID Message

*8090	ID OK	Program ID Message

CW Chart:

0 - 00	9 - 09	I - 18	R - 27
1 - 01	A - 10	J - 19	S - 28
2 - 02	B - 11	K - 20	T - 29
3 - 03	C - 12	L - 21	U - 30
4 - 04	D - 13	M - 22	V - 31
5 - 05	E - 14	N - 23	W - 32
6 - 06	F - 15	O - 24	X - 33
7 - 07	G - 16	P - 25	Y - 34
8 - 08	H - 17	Q - 26	Z - 35

Setting the Tone Frequencies (x = 0-9)

*4560x	IDT OK	Set ID Pitch
*4561x	CT1 OK	Set Repeater Courtesy Tone
*4562x	CT2 OK	Set Link Courtesy Tone
*4563x	CT3 OK	Set Remote Base Courtesy Tone
*4564x	ACK OK	Set Command Acknowledgment Tone
*4565x	PT OK	Set Privacy Tone

TONE CHART:

0 = 400 Hz	5 = 1225 Hz
1 = 500 Hz	6 = 1530 Hz
2 = 625 Hz	7 = 1910 Hz
3 = 780 Hz	8 = 2375 Hz
4 = 975 Hz	9 = 2980 Hz

Setting the Hang Timers (x = 0-9)

*7410x	HT OK	Set Repeater Hang Time
*7411x	LT OK	Set Link Hang Time
*7412x	RT OK	Set Remote Base Hang Time

HANG TIME CHART:

0 = .05 Sec	5 = 2.0 Sec
1 = .25 Sec	6 = 2.5 Sec
2 = .50 Sec	7 = 3.0 Sec
3 = 1.00 Sec	8 = 3.5 Sec
4 = 1.50 Sec	9 = 4.0 Sec

CODE	RESPONSE	
		Setting the Time-out Timers (x = 0-5)
*7413x	TO OK	Set Repeater Timer
*7414x	ATO OK	Set T-P Access Time-out
*7415x	APTO OK	Set Autopatch Activity Timer
	TIME-OUT CHART:	0 = .5 Min 3 = 2.0 Min 1 = 1.0 Min 4 = 2.5 Min 2 = 1.5 Min 5 = 3.0 Min
		Setting CW Speeds (x = 0-4)
*7416x	IS OK	Set ID Speed
*7417x	AS OK	Set Acknowledgment Speed
	SPEED CHART:	0 = 10 WPM 3 = 25 WPM 1 = 15 WPM 4 = 30 WPM 2 = 20 WPM
		Link Selection/Timing
*74180	LNK OK	Select Simplex Link
*74181	LNK OK	Select Duplex Link
		ID Timing
*74190	IDI OK	Normal
*74191	IDI OK	10 Second Delay
		Preset Modes
*489x	PSx OK	Setup Preset Mode #x (x=0-9)
		Setting the Operating Mode
*8101	MD 1 OK	Select Mode #1 (BASIC Operation)
*8102	MD 2 OK	Select Mode #2 (EXPANDED Operation)

CODE	RESPONSE		
Programming the Command Prefixes			
MODE 1 Commands:			
*40900	MID OK	Set Manual ID Code	54
*40901	RPT OK	Set Repeater Command Prefix	2587
*40902	LNK OK	Set Link Command Prefix	321
*40903	RMT OK	Set Remote Base Command Prefix	654
*40904	AUX OK	Set Auxiliary Control Command Prefix	47
*40905	COP OK	Set Control Operator Command Prefix	852
*40906	TP OK	Set TT Access Command Prefix	55
*40907	PS OK	Set Preset Mode Prefix	08
MODE 2 Commands:			
*40908	PA OK	Set Autopatch Access Code	*841
*40909	PD OK	Set Autopatch Disconnect Code	#8
*40910	RPA OK	Set Remote Autopatch Access Code	*89
*40911	RPD OK	Set Remote Autopatch Disconnect Code	#9
*40912	AD OK	Set Autopatch Autodial Prefix	*
*40913	OL OK	Set Dialing Prefix	-
*40914	CH OK	Set Channel Select Prefix	82
*40915	CK OK	Set Remote Base Freq. Check Code	36
*40916	RBF OK	Set Remote Base Freq. Command Prefix	58
*40917	MEM OK	Set Memory Command Prefix	14
*40918	ST OK	Set CTCSS Prefix	21
*40919	RBS OK	Set Remote Base Select Prefix	53
*40920	RAC OK	Set Remote Patch Access (System)	*
*40921	RDC OK	Set Remote Patch Disconnect (System)	#
*40922	RAD OK	Set Remote Patch Autodial (System)	*

Locking the RFC 8-RC

#*	LOCK	Secure Controller

Initializing the RFC 8-RC

0 UNLOCK CODE 0	Initialize RFC 8-RC (Use ONLY in case of malfunction)

NOTE: The following commands are used in MODE 2 ONLY

Programming the Memory Channels (x = 0-9)

*963x	M x	Program Memory Channel (x = Channel #)

Programming the Autodial Numbers (xx = 01-50)

*586xx	AD xx	Program Autodial Number (xx = 00-99)

CONTROL OPERATOR COMMANDS

CODE	RESPONSE	FUNCTION
		System Reset
AC		Reset Microprocessor
		(xx = Repeater Control Prefix)
xx0	OFF	System Off
xx1	ON	System On - Carrier Access
xx2	TS	System On - Tone Access
xx3	DC	System in Duplex Control Mode
xx4	DC TS	System in Tone Access Duplex Control Mode
		Control Operator Commands
		(xx = Control Operator Prefix)
xx000	CT OFF	Courtesy Tones Off
xx001	CT ON	" " On
xx010	ARM OFF	Alarm Off
xx011	ARM ON	" On
xx020	PT OFF	Privacy Tone Off
xx021	PT ON	" " On
xx030	RTO OFF	Repeater Time-out Off
xx031	RTO ON	" " On
xx040	LTO OFF	Link Time-out Off
xx041	LTO ON	" " On
xx050	RBTO OFF	Remote Base Time-out Off
xx051	RBTO ON	" " " On
xx060	TP OFF	T-P Access Mode Off
xx061	TP ON	" " " On
xx070	ID OFF	ID'er Off
xx071	ID ON	" Repeater Only
xx072	ID 2	" Repeater/Link
xx073	ID 3	" Repeater/Remote Base
xx074	ID 4	" Repeater/Link/Remote Base
xx080	USR OFF	User Commands Off
xx081	USR ON	" " On
xx090	CC OFF	Link Configuration #1 (Cross-connect OFF)
xx091	CC ON	" " #2 (" " ON)

CODE	RESPONSE	FUNCTION
xx101	AM 0	Access Mode #1 (Carrier for all commands)
xx102	AM 1	Access Mode #2 (CTCSS required for Setup Commands)
xx103	AM 2	Access Mode #3 (CTCSS required for Control Operator/Setup Commands)
xx104	AM 3	Access Mode #4 (CTCSS required for all commands)
xx110	LTA OFF	Link Transmitter-Carrier Access
xx111	LTA ON	" " -CTCSS ACCESS
xx120	RBTA OFF	Remote Base Transmitter-Carrier Access
xx121	RBTA ON	" " " -CTCSS Access
xx130	Dit-dit	CW Acknowledgments Off
xx131	CW ON	" " " On
		Control receiver
xx140	AXK 0	CW Acknowledgments None
xx141	AXK 1	" " " Repeater/Link
xx142	AXK 2	" " " Repeater/Remote Base
xx143	AXK 3	" " " Repeater/Link/Remote Base
xx150	AP OFF	Autopatch Off
xx151	AP ON	" On
xx152	AP TS	" CTCSS Access
xx161	OH	" Off-Hook
xx170	APTO OFF	Autopatch Activity Timer Off
xx171	APTO ON	" " " On
xx180	TC OFF	Toll Call Access Off
xx181	TC ON	" " " On
xx190	PP OFF	Autopatch in Normal Mode
xx191	PP ON	Autopatch in Private Mode (Silent)
xx192	PPT ON	Autopatch in Private Mode (Privacy Tone)
xx200	RP OFF	Remote Patch Disable
xx201	RP ON	" " Enable
xx202	RPTA	Remote Patch CTCSS Access

CODE	RESPONSE		
xx	Call sign	Manual ID	xx = Manual ID Code

T-P Access (xx = T-P Access Prefix)

xx0	UP	TP Access UP
xx1	DN	TP Access DOWN

Auxiliary Outputs (xx = Auxiliary Command Prefix) (y = Line # <1-8>)

xxy0	F y OFF	Set Aux Output Line to OFF
xxy1	F y ON	Set Aux Output Line to ON
xx0	#	Check Aux Status (# = Activated Outputs)

Preset Operating Modes (xx = Preset Prefix)

xxy	PS y	Select 1 of 10 Preset Operating Modes (y = 0-9)

Autopatch

xxx	AP	Autopatch Access	(xxx = Patch Access Code)
yyy	DN	Autopatch Disconnect	(yyy = Patch Dump Code)
xxx*	RD	Autopatch Access - Last # Redial	

Remote Autopatch

xxx	..	Remote Autopatch Access (xxx = Remote Patch Connect Code)
xxx*		Remote Autopatch Redial
xxxyy		Remote Autopatch Autodial (yy = 00-99)
zzz	..	Remote Autopatch Disconnect (zzz = Remote Patch Disconnect Code)

Link Commands (xx = Link Prefix)

xx0	LNK OFF	Link Off
xx1	LNK RX	Link Receive Only
xx2	LNK TX	Link Transmit Only
xx3	LNK ON	Link Receive/Transmit
xx4	LNK ???	Check Link Status

CODE	RESPONSE	FUNCTION
		Select Link/Remote Base Channel (xx = Channel Select Prefix)
xxy	CH y	Set Link/Remote Base Channel (y = Channel # <1-8>)
xx0	CH #	Check Channel Status (# = Channel Selected)
		Remote Base Commands (xx = Remote Base Prefix)
xx0	RMT OFF	Remote Base Off
xx1	RMT RX	Remote Base Receive Only
xx2	RMT TX	Remote Base Transmit Only
xx3	RMT ON	Remote Base Receive/Transmit
xx4	RMT ???	Check Remote Base Status

Set Frequency Command
(xx = Frequency Set Prefix)

Freq — Set Remote Base Frequency

xx+(MHz)+(100KHz)+(10KHz)+(1KHz)+(0 = Simplex)
(1 = Minus)
(2 = Plus)

Check Remote Base Frequency

xx	-----	Check Remote Base Frequency	xx = Frequency Check Code

Select CTCSS Tone (xx = CTCSS Prefix)

xx00	ST OFF	Disable Sub-audible Tone
xxyy	ST yy	Set Sub-audible Tone yy = Tone # (01-32)

Select Remote Base Memory Channel
(xx = Memory Prefix)

xx#	M #	Select Memory Channel (# = Channel # <0-9>)

Select Remote Base (xx = Remote Base Select Prefix)

xxy	RB y	Select Remote Base	y = Remote Base # (1-8)
xx0	RB #	Check Remote Base Status	(# = Remote Base Selected)

DEFAULT SETTINGS

Manual ID	54
Remote Base Frequency Check	36
Repeater Operator Prefix	2587
Link Prefix	321
Remote Base Prefix	654
Remote Base Freq Prefix	58
Auxiliary Prefix	47
Control Operator Prefix	852
Memory Prefix	14
Patch Access Code	*841
Patch Disconnect Code	#8
Autodial Prefix	*
Preset Prefix	08
T-P Access Prefix	55
CTCSS Prefix	21
Remote Base Select Prefix	53
Channel Select Prefix	82
Remote Autopatch Access	*89
Remote Autopatch Disconnect	#9
Remote Autopatch Access (System)	*
Remote Autopatch Autodial (System)	*
Remote Autopatch Disconnect (System)	#

ID Message	CALL/R - Enabled
ID Timing Delay	Normal
Hang Timers	1.5 Second
Time-out Timer	3.0 Minutes - Enabled
Repeater	ON
Link/Remote Base	OFF
Link Configuration	Simplex / Option #1 (Normal)
Courtesy Tones	ON
Alarm	OFF
Privacy Tone	ON
CW Acknowledge	ON
T-P Access	OFF (1 Min)
Access	Option #1 - Carrier Access
Autopatch	ON - Carrier Access
Autopatch Activity Timer	ON (30 Sec)
Toll Call Access	OFF
Private Patch	OFF
Preset Modes	Set to above parameters
System Mode	Mode #1
Auxiliary Outputs	OFF
Autodial Numbers	Blank
Channel Select	Channel #1
CTCSS Encoder	OFF
Remote Base Select	Remote Base #1
Remote Base Memories	xx6.520 Simplex

PIN CONNECTIONS

1 - Audio Ground

2 - Remote Base Receive Audio

3 - Audio +5 volts

4 - Link Receive Audio

5 - Control Receive Audio

6 - Aux Transmit Audio

7 - Repeater Receive Audio

8 - Tone Out (Autopatch)

9 - Tone In (Autopatch)

10 - Transmitter Audio

11 - Repeater $\overline{\text{PTT}}$

12 - N/C

13 - Link $\overline{\text{PTT}}$

14 - N/C

15 - Remote Base $\overline{\text{PTT}}$

16 - External $\overline{\text{Reset}}$

17 - N/C

18 - Digital +5 volts

19 - N/C

20 - $\overline{\text{Alarm}}$

21 - $\overline{\text{Patch Busy}}$ (Autopatch)

22 - $\overline{\text{Ring Detect}}$

23 - CTCSS Decoder Input

24 - Control Receiver $\overline{\text{COS}}$

25 - Remote Base Receiver $\overline{\text{COS}}$

26 - Link Receiver $\overline{\text{COS}}$

27 - Repeater Receiver $\overline{\text{COS}}$

28 - Digital Ground

29 - FREQ $\overline{\text{Strobe}}$

30 - AUX $\overline{\text{Strobe}}$

31 - FREQ $\overline{\text{Reset}}$

32 - AP $\overline{\text{Strobe}}$

33 - Aux $\overline{\text{Data 8}}$

34 - Aux $\overline{\text{Data 4}}$

35 - Aux $\overline{\text{Data 2}}$

36 - Aux $\overline{\text{Data 1}}$

NOTE: $\overline{\text{xx}}$ designates the pin goes to ground or 0 voltage when activated, or requires a ground to to activate the desired function.

WARRANTY

RF CONCEPTS, Division of Kantronics, warrants each RFC 8-RC free from defects in material and workmanship under normal use and service for a period of 1 year after the delivery to the ultimate user.

The unit must be returned to the factory, freight prepaid. The warranty card must have been submitted within 15 days after purchase. Any unauthorized repair may void this warranty.

RF CONCEPTS will provide, free of charge, both parts and labor, as necessary, to correct any defect occurring within the warranty period.

This warranty applies to the original owner only.

This warranty applies only to those units that fail during normal operation. Any unit that has been overvoltaged, modified, accidentally damaged or misused will not be covered.

RF CONCEPTS will not assume any responsibility for damage to any radio or accessory connected to this product.

This warranty is in lieu of all other warranties expressed or implied, and no representative or person is authorized to assume for RF Concepts any other liability in connection with the sale of its products.

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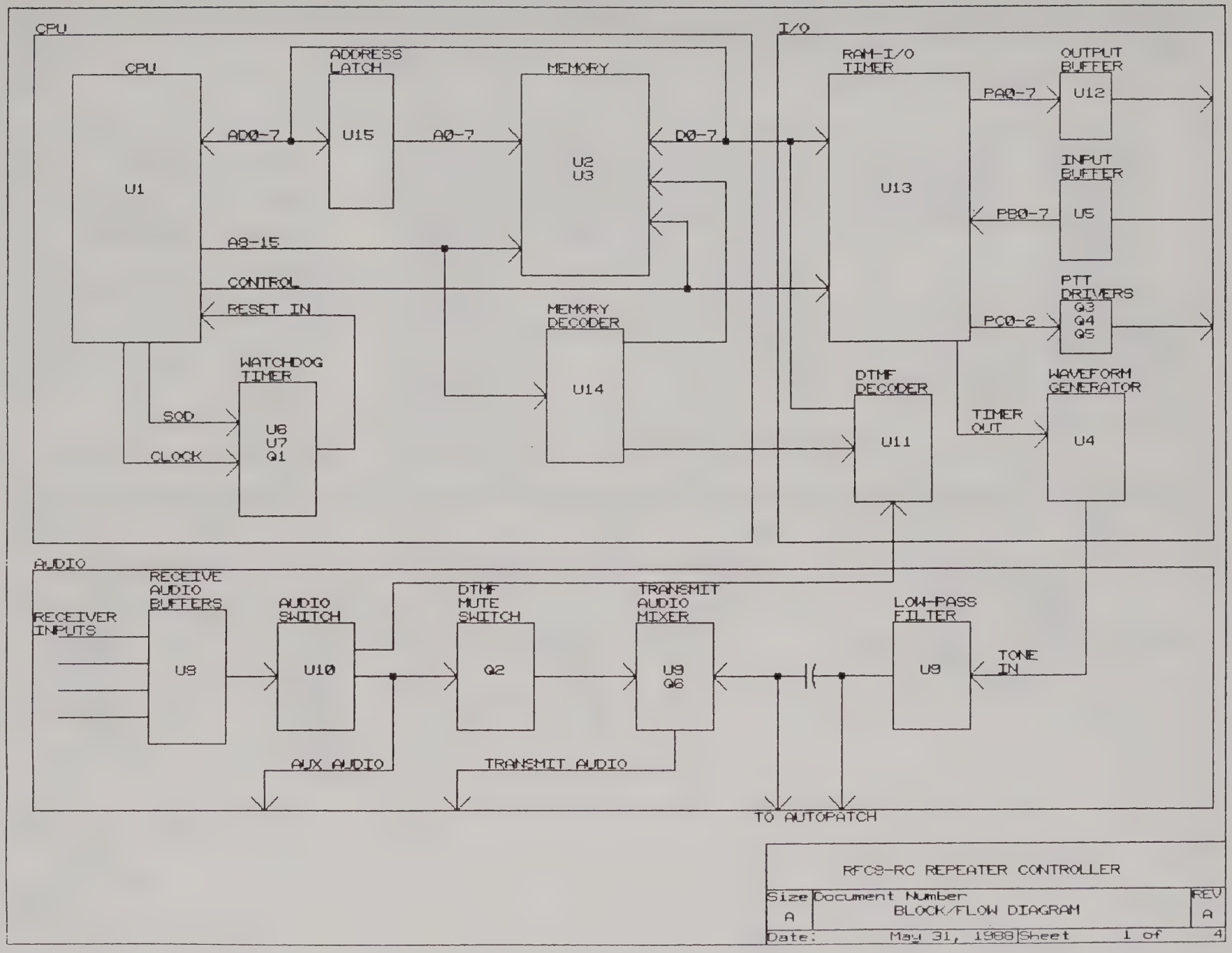

RFC8-RC REPEATER CONTROLLER

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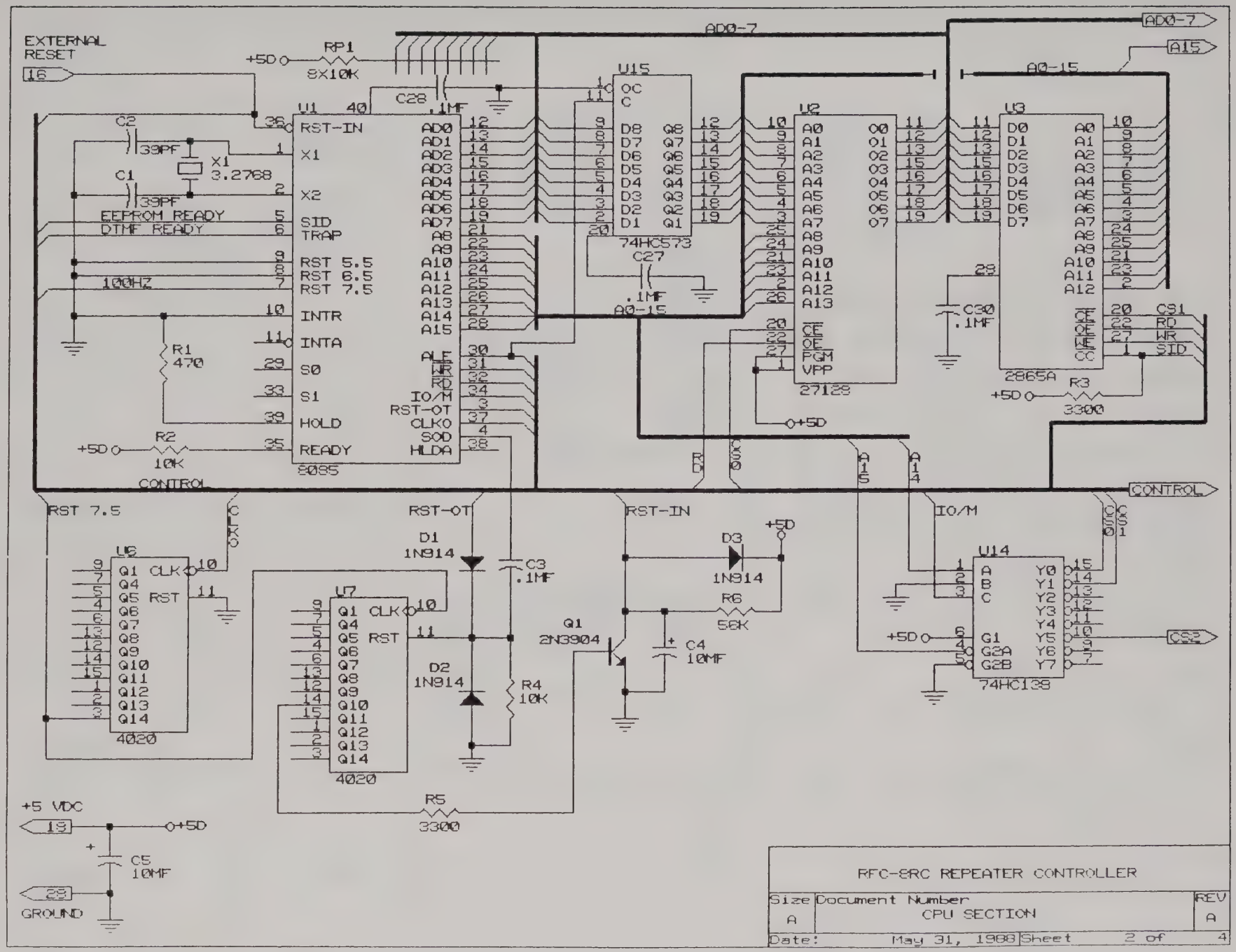
Date: May 31, 1988	Sheet 1 of 4	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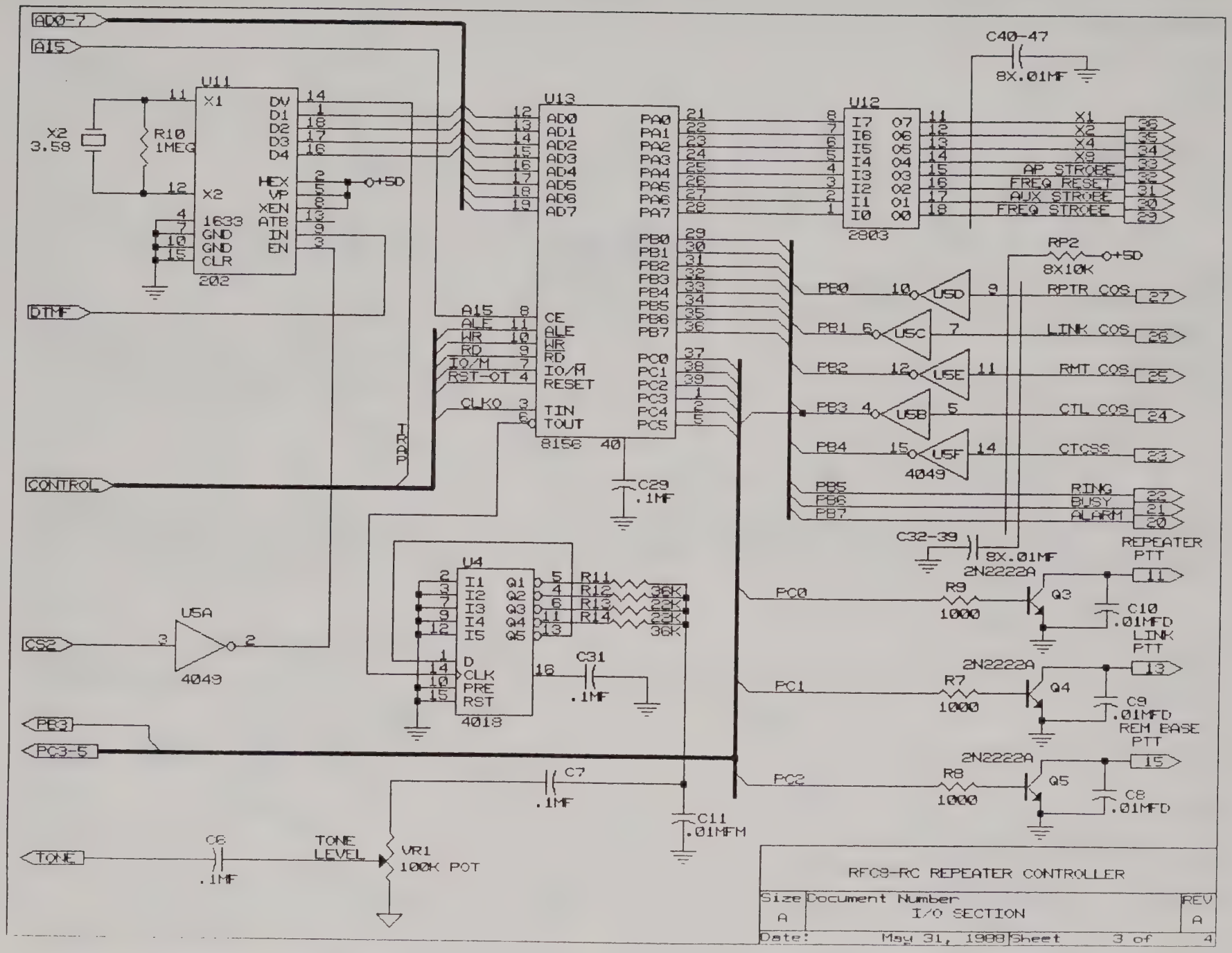
+5D
RP1
8X10K
C28 .1MF
U1 8085
RST-IN
X1
X2
X1 3.2768
C2 39PF
C1 39PF
EEPROM READY
DTMF READY
SID
TRAP
RST 5.5
RST 6.5
RST 7.5
100HZ
INTR
INTA
S0
S1
HOLD
READY
R1 470
R2 10K
ALE
WR
RD
IO/M
RST-OT
CLKO
SOD
HLDA
AD0
AD1
AD2
AD3
AD4
AD5
AD6
AD7
A8
A9
A10
A11
A12
A13
A14
A15
AD0-7
A0-15
CONTROL
U15
74HC573
C27 .1MF
U2
27128
U3
2865A
C30 .1MF
R3 3300
CS1
RD
WR
SID
U5
4020
U7
4020
RST 7.5
RST-OT
RST-IN
IO/M
D1 1N914
D2 1N914
D3 1N914
C3 .1MF
C4 10MF
R4 10K
R5 3300
R6 50K
Q1 2N3904
U14
74HC138
CS2
+5 VDC
C5 10MF
GROUND
RFC-8RC REPEATER CONTROLLER
Size A
Document Number CPU SECTION
REV A
Date: May 31, 1988
Sheet 2 of 4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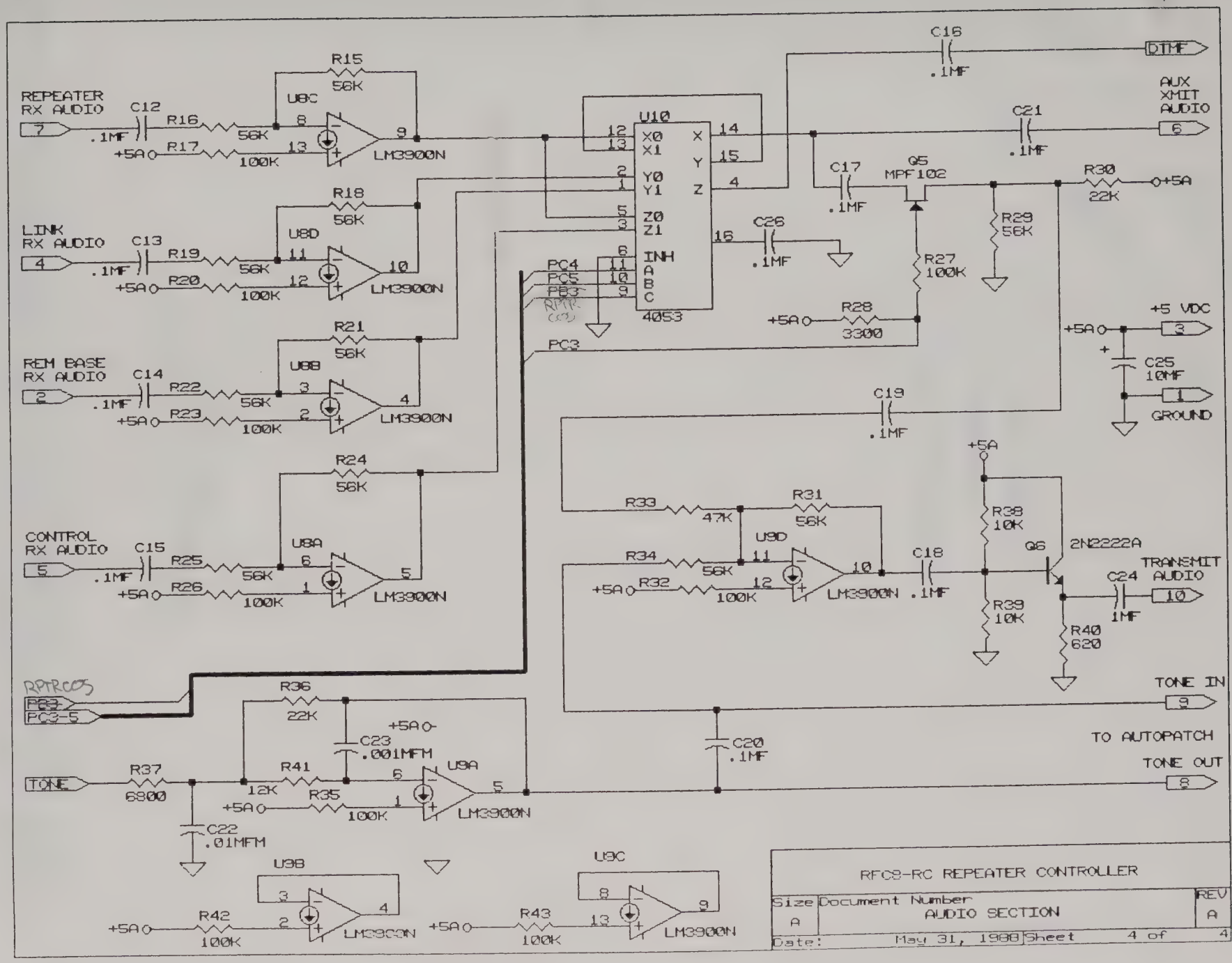
A15
U11
X1
X2
3.58
R10
1MEG
1633
GND
GND
CLR
202
DV
D1
D2
D3
D4
HEX
VP
XEN
ATB
IN
EN
+5D
DTMF
CONTROL
U13
AD0
AD1
AD2
AD3
AD4
AD5
AD6
AD7
A15
ALE
WR
RD
IO/M
RST-OT
CLKO
CE
ALE
WR
RD
IO/M
RESET
TIN
TOUT
8156
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
PC0
PC1
PC2
PC3
PC4
PC5
C29
.1MF
U12
I7
I6
I5
I4
I3
I2
I1
I0
O7
O6
O5
O4
O3
O2
O1
O0
2803
C40-47
8X.01MF
X1
X2
X4
X8
AP STROBE
FREQ RESET
AUX STROBE
FREQ STROBE
RP2
8X10K
U5D
U5C
U5E
U5B
U5F
4049
RPTR COS
LINK COS
RMT COS
CTL COS
CTCSS
RING
BUSY
ALARM
C32-39
8X.01MF
U4
I1
I2
I3
I4
I5
Q1
Q2
Q3
Q4
Q5
R11
R12
R13
R14
36K
22K
22K
36K
D
CLK
PRE
RST
4018
C31
.1MF
U5A
CS2
4049
PC0
PC1
PC2
R9
R7
R8
1000
2N2222A
Q3
Q4
Q5
C10
.01MFD
LINK PTT
C9
.01MFD
REM BASE PTT
C8
.01MFD
REPEATER PTT
11
13
15
PB3
PC3-5
C7
.1MF
C11
.01MFM
TONE
C6
.1MF
TONE LEVEL
VR1
100K POT
RFC3-RC REPEATER CONTROLLER
Size
A
Document Number
I/O SECTION
REV
A
Date:
May 31, 1988
Sheet
3 of
4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LINK RX AUDIO
REM BASE RX AUDIO
CONTROL RX AUDIO
TONE
U8C
U8D
U8B
U8A
U9D
U9A
U9B
U9C
U10
4053
LM3900N
MPF102
2N2222A
R15 56K
R16 56K
R17 100K
R18 56K
R19 56K
R20 100K
R21 56K
R22 56K
R23 100K
R24 56K
R25 56K
R26 100K
R27 100K
R28 3300
R29 56K
R30 22K
R31 56K
R32 100K
R33 47K
R34 56K
R35 100K
R36 22K
R37 6800
R38 10K
R39 10K
R40 620
R41 12K
R42 100K
R43 100K
C12 .1MF
C13 .1MF
C14 .1MF
C15 .1MF
C16 .1MF
C17 .1MF
C18 .1MF
C19 .1MF
C20 .1MF
C21 .1MF
C22 .01MFM
C23 .001MFM
C24 1MF
C25 10MF
C26 .1MF
+5A
+5 VDC
GROUND
DTMF
AUX XMIT AUDIO
TRANSMIT AUDIO
TONE IN
TO AUTOPATCH
TONE OUT
PC4
PC5
PB3
PC3
RPTRCOS
RFC8-RC REPEATER CONTROLLER
Size A
Document Number AUDIO SECTION
REV A
Date: May 31, 1988
Sheet 4 of 4

Stu as per Everett Nancy @ RFC division

RFC 8-AP

AUTOPATCH

INSTRUCTION MANUAL

RF Concepts
Division of Kantronics

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INTRODUCTION	1-1
INSTALLATION/SETUP	2-1
CONTROL OPERATOR COMMANDS	3-1
USER COMMANDS	4-1
PIN CONNECTIONS	A-1
WARRANTY	B-1

WARNING: This product contains static sensitive components. Take proper precautions to prevent static buildup while handling.

INTRODUCTION

The RF Concepts RFC 8-AP Autopatch provides a very powerful interface between the telephone line and a repeater which uses the RFC 8-RC Repeater Controller. All command codes and timers relating to autopatch operation are remotely programmable and are stored in non-volatile memory. In addition to standard autopatch operation, the RFC 8-AP has many advanced features.

The RFC 8-AP features DTMF tone regeneration. What this means is all DTMF tones received from the user will be regenerated with clean, noise-free tones which are then transmitted into the telephone line. This greatly reduces the chances of improper dialing due to a user's signal being noisy, weak, or distorted.

Another advanced feature of the RFC 8-AP is the Autodialer. This Autodialer has the capacity to store up to 100 separate telephone numbers, including area code if required, into non-volatile memory. This allows a user to make an autopatch call by entering as few as three digits. Also, a user may redial the last number dialed by entering as little as two digits.

The RFC 8-AP may be remotely commanded to either allow or disallow toll calls (long distance) from being made through the autopatch. Also provided is an activity timer which may be remotely programmed and switched on or off.

Reverse autopatch as well as remote control via telephone are also provided by the RFC 8-AP. Calls coming in to the RFC 8-AP, from the telephone line, will be answered and the RFC 8-AP will enter the remote command mode. If the caller enters the proper DTMF command, the telephone line will be connected to the repeater and the person on the telephone may then converse with persons on the repeater.

The RFC 8-AP also contains the circuitry for decoding the eight Auxiliary Outputs and the eight Channel Select Lines. Control of the RFC 8-AP requires the use of the Auxiliary Outputs from the RFC 8-RC. These out puts are transferred to RFC 8-AP and are available from this board.

The RFC 8-AP also contains the eight Channel Select line for use with a crystal controlled Link or Remote Base.

INSTALLATION

Installation of the RFC 8-AP Autopatch is relatively simple and straight forward. There are two connections for the telephone line, four connections for power, two connections to the repeater receiver, and fourteen connections to the RFC 8-RC Repeater Controller.

IMPORTANT: It is highly recommended that an FCC approved Telephone Interface Coupler be used between the RFC 8-AP and the telephone lines. This coupler can be obtained from:

MOREY CO.
2659 WISCONSIN AVENUE
DOWNERS GROVE, IL 60515

Order: Model #10X2700 Telephone Interface Coupler

POWER SUPPLY CONNECTIONS

The RFC 8-AP requires +12 volts DC at 000 MA This may be obtained from the repeater or a separate power supply. These two +12 lines should be connected together ONLY at the power source. There are also two separate ground connections required. These grounds should be connected to the corresponding pins on the RFC 8-RC. The pins for the power connections are:

Pin 1 - Audio Ground (to Pin 1 on RFC 8-RC)

Pin 3 - Audio +12 (to +12 power source)

Pin 17 - Digital +12 (to +12 power source)

Pin 28 - Digital Ground (to Pin 28 on RFC 8-RC)

TELEPHONE LINE CONNECTIONS

The two connections for the telephone are pins 12 and 14. The RFC 8-AP is not polarity sensitive. It is recommended that these two pins be connected to the Telephone Interface Coupler then to a RJ-11 (modular) jack and the telephone line be plugged into the jack and NOT wired directly to the RFC 8-AP.

REPEATER RECEIVER CONNECTIONS

The RFC 8-AP requires two connections to the repeater receiver. These are Repeater Receive Audio and Repeater COS. If you have already installed the RFC 8-RC, these lines are already present on pins 7 and 27 of the RFC 8-RC. If the RFC 8-RC has already been installed, move the wire from pin 7 on the RFC 8-RC (Repeater Receive Audio) to pin 2 of the RFC 8-AP and the wire from pin 27 on the RFC 8-RC (Repeater COS) to pin 19 of the RFC 8-AP. If the RFC 8-RC has not been previously installed, these connections will have to be made to the repeater receiver. See the RFC 8-RC Owner's Manual for more information.

RFC 8-RC CONNECTIONS

There are fourteen connections, plus the ones on page 2-1, to be made to the RFC 8-RC from the RFC 8-AP. These connections are made to the corresponding pins on the RFC 8-RC. These connections are:

RFC 8-AP AUTOPATCH	FUNCTION	RFC 8-RC CONTROLLER
Pin 5	Control Receiver Audio In	Pin 5
Pin 7	Repeater Receiver Audio Out	Pin 7
Pin 8	Tone In	Pin 8
Pin 9	Tone Out	Pin 9
Pin 21	Patch Busy	Pin 21
Pin 22	Ring Detect	Pin 22
Pin 24	Control COS Out	Pin 24
Pin 27	Repeater COS Out	Pin 27
Pin 30	Aux Strobe In	Pin 30
Pin 32	Autopatch Strobe IN	Pin 32
Pin 33	Aux Data 8 In	Pin 33
Pin 34	Aux Data 4 In	Pin 34
Pin 35	Aux Data 2 In	Pin 35
Pin 36	Aux Data 1 In	Pin 36

AUX / CHANNEL SELECT OUTPUTS

These outputs are available via the two 9-pin connectors on the end of the board. These outputs go to ground when active (open-collector). The connector nearest the edge of the board contains the eight AUX outputs and the connector nearest the center of the board contains the eight Channel Select Outputs. The pins are numbered in the same direction as the fingers for the edge connector. That is, pin 1 is on the same side of the board as pin 1 on the edge connector and pin 9 is on the side with pin 36. The connections for both the Auxiliary and the Channel Select Outputs are listed below.

Pin 1 - Output #4	Pin 4 - Output #2	Pin 7 - Output #1
Pin 2 - Output #3	Pin 5 - Output #7	Pin 8 - Output #5
Pin 3 - Output #8	Pin 6 - Output #6	Pin 9 - Ground

The first step in the setup procedure is to program the various timers and command codes. The procedures for setting these parameters are found in the Setup Commands chapter in the RFC 8-RC manual.

Page 5-3 AUTOPATCH ACTIVITY TIMER

Page 5-4 COMMAND PREFIXES

Page 5-5 AUTODIAL NUMBERS

Page 5-5 DIALING PREFIX

Page 5-6 REMOTE AUTOPATCH

The next step is setting the levels on the RFC 8-AP Autopatch. These levels are preset at the factory and should be tried before any adjustments are made. The three adjustments are DTMF level, receive level, and transmit level.

PRIVATE PATCH - System MODE 2

There are three different types of operation available for the autopatch. In normal operation, all audio from the repeater receiver will be passed on to the repeater transmitter. Select this mode by entering the Control Operator Prefix followed by '190'. The RFC 8-RC will respond with "PP OFF".

Private Patch Mode #1 inhibits all audio from the repeater receiver from being passed on to the repeater transmitter. Only audio from the telephone line will be heard over the repeater transmitter. Select this mode by entering the Control Operator Prefix followed by '191'. The controller will respond with "PP ON".

Private Patch Mode #2 is the same as Mode #1 except that when the repeater receiver is active the DTMF Privacy Tone will be sent over the repeater transmitter. This mode is selected by entering the Control Operator Prefix followed by '192'. The RFC 8-RC will respond with "PPT ON".

REMOTE AUTOPATCH

This command is used to enable and disable access to a remote autopatch. To disable access, enter the Control Operator Prefix followed by '200'. The controller will respond with "RP OFF". To allow access, enter the Control Operator Prefix followed by '201'. The RFC 8-RC will respond with "RP ON".

AUTOPATCH (Default) Access code *841
Disconnect code #8

To access the autopatch enter the Autopatch Access Code. If the patch is enabled the RFC 8-RC will respond in CW with "AP". After the controller sends "AP", enter the telephone number. When you untie after entering the number, the RFC 8-RC will connect to the telephone line and redial the number with regenerated tones. You must begin dialing your number within ten seconds or the autopatch will disconnect. After you have dialed your number the autopatch timer will be set to the value programmed with the Setup Commands. This timer will reset each time you make a transmission. To shut off the autopatch enter the Autopatch Disconnect Code. The RFC 8-RC will respond with "DN" and disconnect.

REDIAL (Default) Redial *841*
Disconnect #8

To redial the last number dialed on the autopatch, enter the Autopatch Access Code followed by '*'. Enter this as one command. The RFC 8-RC will respond with "RD" and automatically dial the number. Disconnecting when the call is completed is the same as normal autopatch operation.

AUTODIAL (Default) Autodial Prefix *
Disconnect #8

To dial a number contained in the autodial memory enter the Autodial Prefix followed by 'xx' where 'xx = 00 - 99' for the desired memory location. The controller will respond with "AD xx" and then dial your number for you. Disconnecting when the call is completed is the same as normal autopatch operation.

REVERSE AUTOPATCH

To originate an autopatch call from the the telephone line, dial the number of the line to which the RFC 8-AP is connected. The RFC 8-AP will answer the call and send a CW ID message to the caller. When the ID is complete, enter the Control Operator Access Code followed by "#". The caller on the telephone line will then be on the air. To disconnect a reverse patch, enter the Autopatch Disconnect Code followed by "#".

CONTROL VIA TELEPHONE LINE

Control of the RFC 8-RC via the telephone line is very similar to making a reverse autopatch call. After the RFC 8-RC answers and sends its ID message, commands may entered via the telephone line. Operation is the same as entering commands via radio except you MUST add a "#" to the end of each command. When all commands are completed, disconnect the same as a reverse autopatch.

CHANNEL SELECT (Default) 82

In the case of a multi-channel crystal link or remote base you may select one of eight channels by entering the Channel Prefix followed by the desired channel number (1-8). The RFC 8-RC will respond in CW with "CH #" where "#" is the channel number. To check which channel is currently selected, enter the Channel Select Prefix followed by '0'. The RFC 8-RC will respond with "CH #" where "#" is the channel currently selected.

FOR MORE INFORMATION SEE THE RFC 8-RC MANUAL

PIN CONNECTIONS

1 - Audio Ground

2 - Repeater Receive Audio In

3 - Audio +12

4 - N/C

5 - Control Receive Audio Out

6 - N/C

7 - Repeater Receive Audio Out

8 - Tone In

9 - Tone Out

10 - N/C

11 - N/C

12 - Telephone Line #1

13 - N/C

14 - Telephone Line #2

15 - N/C

16 - N/C

17 - Digital +12

18 - N/C

19 - Repeater Receiver COS In

20 - N/C

21 - Patch Busy

22 - Ring Detect

23 - N/C

24 - Control Receiver COS Out

25 - N/C

26 - N/C

27 - Repeater Receiver COS Out

28 - Digital Ground

29 - N/C

30 - Aux Strobe

31 - N/C

32 - AP Strobe

33 - Aux Data 8

34 - Aux Data 4

35 - Aux Data 2

36 - Aux Data 1

N/C - No Connection

WARRANTY

RF CONCEPTS,Division of Kantronics, warrants each RFC 8-AP free from defects in material and workmanship under normal use and service for a period of 1 year after the delivery to the ultimate user.

The unit must be returned to the factory, freight prepaid. The warranty card must have been submitted within 15 days after purchase. Any unauthorized repair may void this warranty.

RF CONCEPTS will provide, free of charge, both parts and labor, as necessary, to correct any defect occurring within the warranty period.

This warranty applies to the original owner only.

This warranty applies only to those units that fail during normal operation. Any unit that has been overvoltaged, modified, accidentally damaged or misused will not be covered.

RF CONCEPTS will not assume any responsibility for damage to any radio or accessory connected to this product.

This warranty is in lieu of all other warranties expressed or implied, and no representative or person is authorized to assume for RF Concepts any other liability in connection with the sale of its products.

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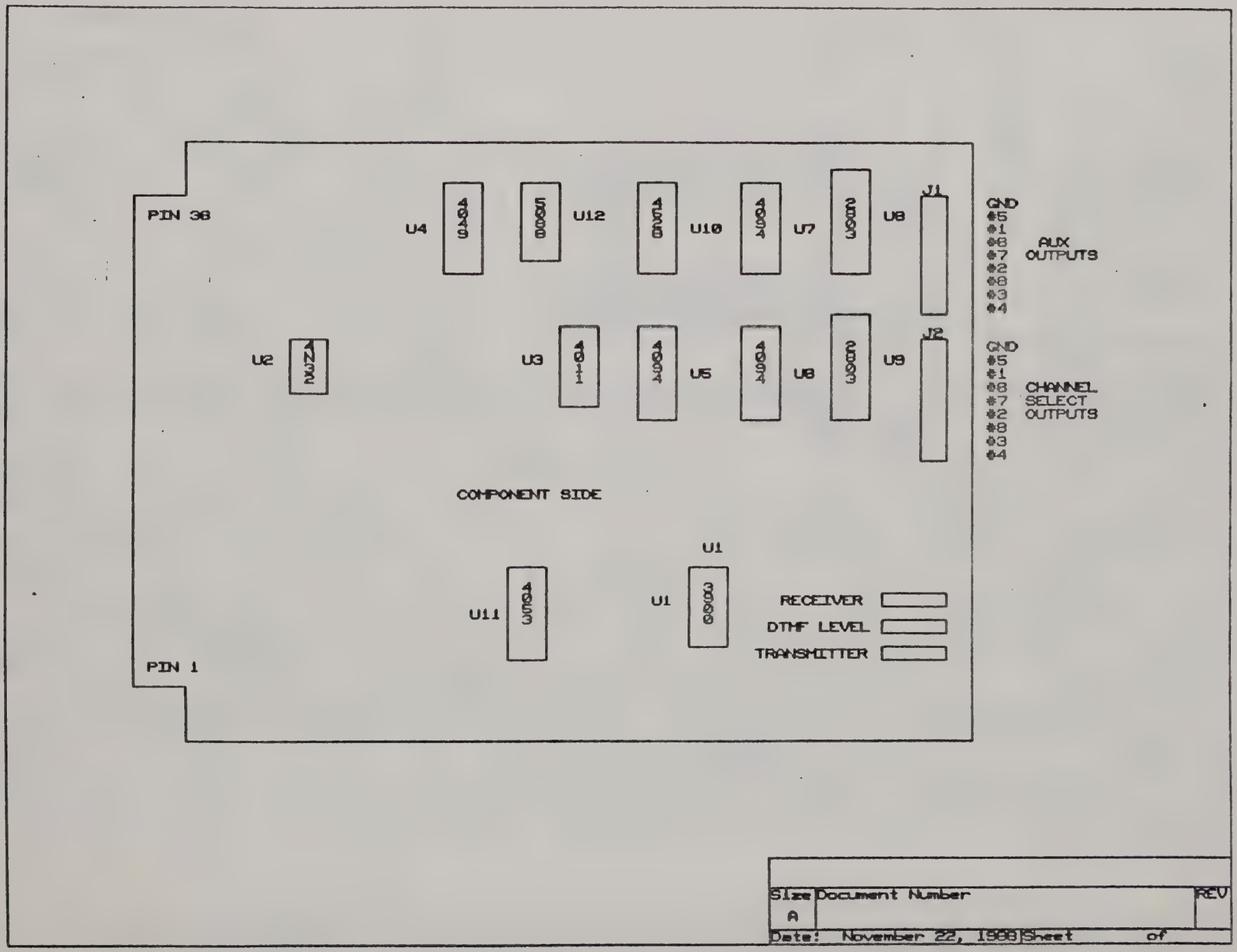
(913)842-7745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U12
U10
U7
U8
J1
GND
#5
#1
#6
#7
#2
#8
#3
#4
AUX
OUTPUTS
U2
U3
U5
U6
U9
J2
GND
#5
#1
#6
#7
#2
#8
#3
#4
CHANNEL
SELECT
OUTPUTS
COMPONENT SIDE
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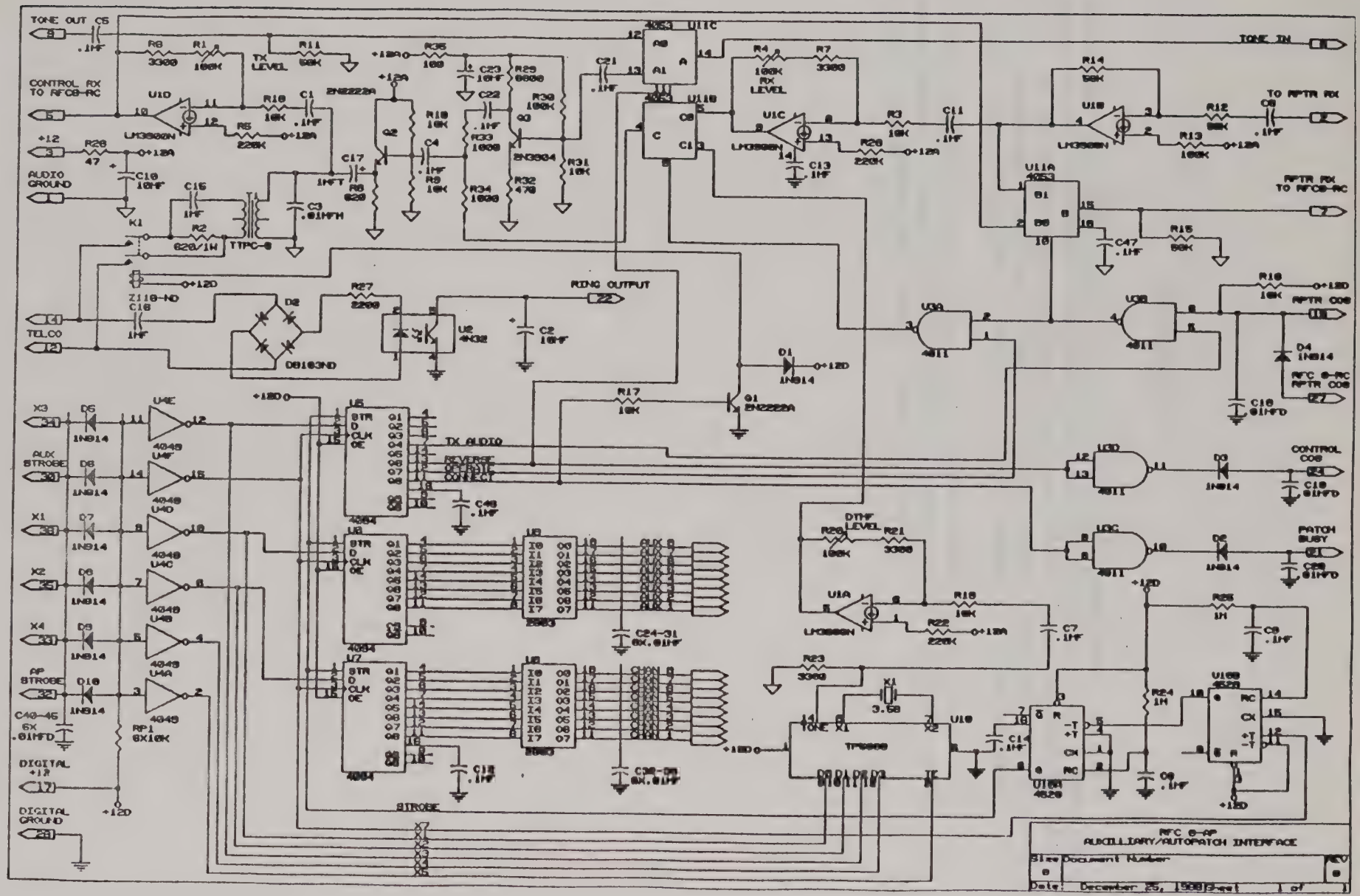
TONE OUT
CONTROL RX TO RFC8-RC
AUDIO GROUND
+12
TELCO
TONE IN
TO RPTR RX
RPTR RX TO RFC8-RC
RING OUTPUT
TX AUDIO
REVERSE PATCH CONNECT
CONTROL COR
PATCH BUSY
RPTR COR
RFC 8-RC RPTR COR
AUX STROBE
AP STROBE
DIGITAL +12
DIGITAL GROUND
STROBE
RFC 8-AP
AUXILLIARY/AUTOPATCH INTERFACE
Size
Document Number
Date: December 25, 1988
Sheet 1 of 1

RB

INTRODUCTION

The RF Concepts RFC 8-RB Remote Base Interface provides the necessary control signals to interface a frequency agile transceiver to a repeater using the RFC 8-RC Repeater Controller. The RFC 8-RB has its own microprocessor which enables it to be interfaced to many different types of transceivers and also contains a remotely programmable CTCSS encoder.

The RFC 8-RB contains relays to switch the remote base signals from the remote base radio on and off the remote base bus on the RFC 8-RC. The RFC 8-RB may be programmed as remote base #1 to #8.

INSTALLATION

Installation of the RFC 8-RB is relatively simple and straight forward. There are four connections for power and ten connections to the RFC 8-RC. All connections to the remote base radio are made through the two connectors on the end of the board opposite the edge connector.

POWER SUPPLY CONNECTIONS

The RFC 8-RB requires power sources of +5 and +12 volts DC. These may be obtained from the repeater or a separate power supply. The RFC 8-RB also requires two separate ground connections. These should be connected together at the ground point and not at the edge connector. The pins for power connections are:

Pin 1 - Audio Ground (to Pin 1 on RFC 8-RC)

Pin 3 - Audio +12 (to +12 power source)

Pin 17 - Digital +12 (to +12 power source)

Pin 18 - Digital +5 (to Pin 18 on the RFC 8-RC)

Pin 28 - Digital Ground (to Pin 28 on RFC 8-RC)

RFC 8-RC CONNECTIONS

There are ten connections to be made to the RFC 8-RC from the RFC 8-RB. These connections are made to the corresponding pins on the RFC 8-RB. These connections are:

RFC 8-RB INTERFACE	FUNCTION	RFC 8-RC CONTROLLER
Pin 2	Remote Base Receive Audio	Pin 2
Pin 6	Aux Transmit Audio	Pin 6
Pin 15	Remote Base PTT	Pin 15
Pin 25	Remote Base COS	Pin 25
Pin 29	FREQ Strobe	Pin 29
Pin 31	FREQ Reset	Pin 31
Pin 33	AUX Data 8	Pin 33
Pin 34	AUX Data 4	Pin 34
Pin 35	AUX Data 2	Pin 35
Pin 36	AUX Data 1	Pin 36

RADIO CONNECTIONS

The RFC 8-RB requires four connections, other than frequency control, to be made to the remote base radio. These are receive and transmit audio. receiver COS, and transmitter PTT. There is an optional CTCSS tone output on the RFC 8-RB that may be used if your system requires a remotely programmable CTCSS encoder. The level of the encoder is set by the multi-turn pot on the end of the board. All the above connections are made to the 6 pin header on the end of the board and are the same as those required of the repeater. Refer to the RFC 8-RC Owner's Manual for more information.

Pin 1 - TX Audio
Pin 2 - COS
Pin 3 - PTT
Pin 4 - RX Audio
Pin 5 - CTCSS Out
Pin 6 - Ground

FREQUENCY CONNECTIONS

The actual connections for frequency control will vary from radio to radio. Listed below are the outputs available from the RFC 8-RB. These connections are made to the 26 pin header on the end of the board.

1 MHz - Pin 22	100 KHz - Pin 23	10 KHz - Pin 15
2 MHz - Pin 24	200 KHz - Pin 21	20 KHz - Pin 13
4 MHz - Pin 26	400 KHz - Pin 19	40 KHz - Pin 11
8 MHz - Pin 25	800 KHz - Pin 17	80 KHz - Pin 9

NORMAL	INVERTED	
+5 KHz - Pin 1	+5 KHz - Pin 2	Frequency Common - Pin 18
Simplex - Pin 7	Simplex - Pin 8	Pin 20
Minus - Pin 5	Minus - Pin 6	
Plus - Pin 3	Plus - Pin 4	Offset Common - Pin 12
	Select - Pin 10	
		Ground - Pin 14
		Pin 16

NOTE: The Common connections are NOT ground. These pins should be tied to a supply voltage equal to that required by the PLL circuitry.

PIN CONNECTIONS

1 - Audio Ground	19 - N/C
2 - Remote Base Receiver Out	20 - N/C
3 - Audio +12	21 - N/C
4 - N/C	22 - N/C
5 - N/C	23 - N/C
6 - Aux Transmit Audio In	24 - N/C
7 - N/C	25 - Remote Base COS Out
8 - N/C	26 - N/C
9 - N/C	27 - N/C
10 - N/C	28 - Digital Ground
11 - N/C	29 - FREQ Strobe
12 - N/C	30 - N/C
13 - N/C	31 - FREQ Reset
14 - N/C	32 - N/C
15 - Remote Base PTT In	33 - AUX Data 8
16 - N/C	34 - AUX Data 4
17 - Digital +12	35 - AUX Data 2
18 - Digital +5	36 - AUX Data 1

PIN CONNECTIONS

1 - Audio Ground	19 - N/C
2 - Remote Base Receiver Out	20 - N/C
3 - Audio +12	21 - N/C
4 - N/C	22 - N/C
5 - N/C	23 - N/C
6 - Aux Transmit Audio In	24 - N/C
7 - N/C	25 - Remote Base COS Out
8 - N/C	26 - N/C
9 - N/C	27 - N/C
10 - N/C	28 - Digital Ground
11 - N/C	29 - FREQ Strobe
12 - N/C	30 - N/C
13 - N/C	31 - FREQ Reset
14 - N/C	32 - N/C
15 - Remote Base PTT In	33 - AUX Data 8
16 - N/C	34 - AUX Data 4
17 - Digital +12	35 - AUX Data 2
18 - Digital +5	36 - AUX Data 1

Item	Quantity	Reference	Part	DESCRIPTION	SOURCE	PART #
1	1	U1	8085	Microprocessor	Jameco	8085A
2	1	U2	74HC573	CMOS Octal Latch	Jameco	74HC573
3	1	U3	2865A	8K EEPROM Memory	Jameco	2865A
4	2	U4,U5	4020	CMOS 16 Bit Counter	Jameco	CD4020
5	1	U6	27128	16K EPROM	Jameco	27128-25
6	1	U7	74HC138	CMOS Decoder	Jameco	74HC138
7	1	U8	8156	RAM - I/O - TIMER	Jameco	8156
8	1	U9	4049	CMOS Buffer/Inverter	Jameco	CD4049
9	1	U10	4018	CMOS Counter	Jameco	CD4018
10	1	U11	2803	Octal Driver	Jameco	ULN2803
11	1	U12	202	DTMF Decoder	Hall-Mark	SSI202
12	2	U13,U15	LM3900N	Operational Amplifier	Jameco	LM3900N
13	1	U14	4053	CMOS Switch	Jameco	CD4053
14	1	X1	3.2768	3.2768 MHz Crystal	Jameco	CY3.27
15	1	X2	3.58 MHZ	3.58 MHz Crystal	Jameco	CY3.57
16	2	C1,C2	22PF	22 PF Disc Capacitor	Digi-Key	P4016
17	19	C3,C6,C7,C12,C13,C14, C15,C16,C17,C18,C19,C20, C21,C26,C27,C28,C29, C30,C31	.1MF	.1 MF 50V Met. Film	Digi-Key	P4525
18	3	C4,C5,C25	10MF	10 MF 25V Tantalum	Digi-Key	P2049
19	16	C8,C9,C10,C32-47	.01MFD	.01 MF 50V Disc(.25 Spc)	Digi-Key	P4300
20	2	C11,C22	.01MFM	.01 MF Poly.	Digi-Key	P3103
21	1	C23	.001MFM	.001 MF Poly.	Digi-Key	P3102
22	1	C24	1MFD	1 MF 35V Bi-Polar	Digi-Key	P1132
23	1	R1	470	1/4 Watt 5% Resistor	Digi-Key	470Ω
24	4	R2,R4,R38,R39	10K	1/4 Watt 5% Resistor	Digi-Key	10KΩ
25	3	R3,R5,R28	3300	1/4 Watt 5% Resistor	Digi-Key	3.3KΩ
26	13	R6,R15,R16,R18,R19,R21, R22,R24,R25,R29,R33,R34	56K	1/4 Watt 5% Resistor	Digi-Key	56KΩ
27	3	R7,R8,R9	1K	1.4 Watt 5% Resistor	Digi-Key	1.0KΩ
28	1	R10	1MEG	1/4 Watt 5% Resistor	Digi-Key	1.0MΩ
29	2	R11,R14	36K	1/4 Watt 5% Resistor	Digi-Key	36KΩ
30	4	R12,R13,R30,R36	22K	1/4 Watt 5% Resistor	Digi-Key	22KΩ
31	9	R17,R20,R23,R26,R27, R32,R35,RS1,RS2	100K	1/4 Watt 5% Resistor	Digi-Key	100KΩ
32	1	R31	39K	1/4 Watt 5% Resistor	Digi-Key	39KΩ
33	1	R37	6800	1/4 Watt 5% Resistor	Digi-Key	6.8KΩ
34	1	R40	620	1/4 Watt 5% Resistor	Digi-Key	620Ω
35	1	R41	12K	1/4 Watt 5% Resistor	Digi-Key	12KΩ
36	1	VR1	100K	100K 15 turn pot.	Digi-Key	01B15
37	2	RP1,RP2	8X10K	Resistor Pack (9)	Digi-Key	09103
38	3	D1,D2,D3	1N914	Switching Diode	Jameco	1N4148
39	1	Q1	2N3904	Transistor	Jameco	2N3904
40	4	Q2,Q3,Q4,Q6	2N2222A	Transistor	Jameco	2N2222A
41	1	Q5	MPF102	Field Effect Transistor	Jameco	MPF102
42	2			Crystal Insulator		
43	1			Edge Connector	Digi-Key	S1364
44	2			14 pin IC socket		
45	6			16 pin IC socket		
46	2			18 pin IC socket		
47	1			20 pin IC socket		
48	2			28 pin IC socket		
49	2			40 pin IC socket		

NOTE: Please supply resistors and diodes with either STRAIGHT leads

Item	Quantity	Reference	Part	DESCRIPTION	SOURCE	PART #
1	1	U1	8085	Microprocessor	Jameco	8085A
2	1	U2	74HC573	CMOS Octal Latch	Jameco	74HC573
3	1	U3	2865A	8K EEPROM Memory	Jameco	2865A
4	2	U4,U5	4020	CMOS 16 Bit Counter	Jameco	CD4020
5	1	U6	27128	16K EPROM	Jameco	27128-25
6	1	U7	74HC138	CMOS Decoder	Jameco	74HC138
7	1	U8	8156	RAM - I/O - TIMER	Jameco	8156
8	1	U9	4049	CMOS Buffer/Inverter	Jameco	CD4049
9	1	U10	4018	CMOS Counter	Jameco	CD4018
10	1	U11	2803	Octal Driver	Jameco	ULN2803B
11	1	U12	202	DTMF Decoder	Hall-Mark	SSI202
12	2	U13,U15	LM3900N	Operational Amplifier	Jameco	LM3900N
13	1	U14	4053	CMOS Switch	Jameco	CD4053
14	1	X1	3.2768	3.2768 MHz Crystal	Jameco	CY3.27
15	1	X2	3.58 MHZ	3.58 MHz Crystal	Jameco	CY3.57
16	2	C1,C2	22PF	22 PF Disc Capacitor	Digi-Key	P4016
17	19	C3,C6,C7,C12,C13,C14, C15,C16,C17,C18,C19,C20, C21,C26,C27,C28,C29, C30,C31	.1MF	.1 MF 50V Met. Film	Digi-Key	P4525
18	3	C4,C5,C25	10MF	10 MF 25V Tantalum	Digi-Key	P2049
19	16	C8,C9,C10,C32-47	.01MFD	.01 MF 50V Disc(.25 Spc)	Digi-Key	P4300
20	2	C11,C22	.01MFM	.01 MF Poly.	Digi-Key	P3103
21	1	C23	.001MFM	.001 MF Poly.	Digi-Key	P3102
22	1	C24	1MFB	1 MF 35V Bi-Polar	Digi-Key	P1132
23	1	R1	470	1/4 Watt 5% Resistor	Digi-Key	470Ω
24	4	R2,R4,R38,R39	10K	1/4 Watt 5% Resistor	Digi-Key	10KΩ
25	3	R3,R5,R28	3300	1/4 Watt 5% Resistor	Digi-Key	3.3KΩ
26	13	R6,R15,R16,R18,R19,R21, R22,R24,R25,R29,R33,R34	56K	1/4 Watt 5% Resistor	Digi-Key	56KΩ
27	3	R7,R8,R9	1K	1.4 Watt 5% Resistor	Digi-Key	1.0KΩ
28	1	R10	1MEG	1/4 Watt 5% Resistor	Digi-Key	1.0MΩ
29	2	R11,R14	36K	1/4 Watt 5% Resistor	Digi-Key	36KΩ
30	4	R12,R13,R30,R36	22K	1/4 Watt 5% Resistor	Digi-Key	22KΩ
31	9	R17,R20,R23,R26,R27, R32,R35,RS1,RS2	100K	1/4 Watt 5% Resistor	Digi-Key	100KΩ
32	1	R31	39K	1/4 Watt 5% Resistor	Digi-Key	39KΩ
33	1	R37	6800	1/4 Watt 5% Resistor	Digi-Key	6.8KΩ
34	1	R40	620	1/4 Watt 5% Resistor	Digi-Key	620Ω
35	1	R41	12K	1/4 Watt 5% Resistor	Digi-Key	12KΩ
36	1	VR1	100K	100K 15 turn pot.	Digi-Key	01B15
37	2	RP1,RP2	8X10K	Resistor Pack (9)	Digi-Key	Q9103
38	3	D1,D2,D3	1N914	Switching Diode	Jameco	1N4148
39	1	Q1	2N3904	Transistor	Jameco	2N3904
40	4	Q2,Q3,Q4,Q6	2N2222A	Transistor	Jameco	2N2222A
41	1	Q5	MPF102	Field Effect Transistor	Jameco	MPF102
42	2			Crystal Insulator		
43	1			Edge Connector	Digi-Key	S1364
44	2			14 pin IC socket		
45	6			16 pin IC socket		
46	2			18 pin IC socket		
47	1			20 pin IC socket		
48	2			28 pin IC socket		
49	2			40 pin IC socket		

NOTE: Please supply resistors and diodes with either STRAIGHT leads

Item	Quantity	Reference	Part	DESCRIPTION	SOURCE	PART #
1	1	X1	3.58 MHZ	3.58 MHz Crystal	Jameco	CY3.57
2	3	C1,C2,C8	10MF	10 MF 25V Tantalum	Digi-Key	P2049
3	4	C3,C4,C5,C6	1MF	1uf/50v Bi-Polar	Digi-Key	P1132
4	4	C7,C9,C10,C49	.1MF	.1 MF 50V Met. Film	Digi-Key	P4525
5	2	C11,C12	22PF	22 PF Disc Capacitor	Digi-Key	P4016
6	2	C13,C14	.001MFM	.001 MF Mylar	Digi-Key	P3102
7	2	C15,C16	.01MFM	.01 MF Mylar	Digi-Key	P3103
8	32	C17,C18,C19-49	.01MFD	.01 MF 50V Disc	Digi-Key	P4300
9	1	RP1	7X10K	10K/7 Element Network	Digi-Key	Q7103
10	1	RP2	9X10K	10K/9 Element Network	Digi-Key	Q9103
11	2	R1,R4	36K	1/4 Watt 5% Resistor	Digi-Key	36KQ
12	2	R2,R3	22K	1/4 Watt 5% Resistor	Digi-Key	22KQ
13	1	R5	470	1/4 Watt 5% Resistor	Digi-Key	470Q
14	2	R6,R7	10K	1/4 Watt 5% Resistor	Digi-Key	10KQ
15	4	R8,R11,R19,R20	470K	1/4 Watt Resistor	Digi-Key	470KQ
16	2	R9,R12	100K	1/4 Watt 5% Resistor	Digi-Key	100KQ
17	4	R10,R13,R14,R16	220K	1/4 Watt 5% Resistor	Digi-Key	220KQ
18	1	R15	100	1/4 Watt 5% Resistor	Digi-Key	100Q
19	1	R17	100KT	100K/15 turn Trimmer	Digi-Key	01B15
20	1	R18	3300	1/4 Watt 5% Resistor	Digi-Key	3.3KQ
21	8	D1-8	1N914	Switching Diode	Jameco	1N4148
22	1	Q1	2N2222A	Transistor	Jameco	2N2222A
23	2	K1,K2	DPDT	DPDT Relay	Same as in Amplifiers	
24	1	U1	8085	Microprocessor	Jameco	8085A
25	1	U2	74HC573	CMOS Octal Latch	Jameco	74HC573
26	3	U3A,U9A,U10A	ULN2803A	Octal Driver	Jameco	ULN2803B
27	3	U3B,U9B,U10B	UDN2981A	Octal Driver	Sprague	
28	1	U4	4018	CMOS Counter	Jameco	CD4018
29	1	U5	4049	CMOS Buffer/Inverter	Jameco	CD4049
30	1	U6	LM3900N	Operational Amplifier	Jameco	LM3900N
31	1	U7	2764	8K EPROM	Jameco	2764-45
32	1	U8	8156	RAM - I/O - TIMER	Jameco	8156
33	1	P1		26 pin Header Socket	Digi-Key	R304ND
34	1	J1		26 pin Header	Digi-Key	923863-R
35	1	P2		6 pin Header Socket	Digi-Key	WM2004
36	1	J2		6 pin Header	Digi-Key	WM1004
	1			14 pin	"	C014
	12			16 pin IC socket	"	C016
	3			18 pin	"	C018
	1			20 pin	"	C020
	1			28 pin	"	C028
	2			40 pin	"	C040
	1			edge connector	"	S1162
	100			crimp pins	"	WM2000

Item	Quantity	Reference	Part	DESCRIPTION	SOURCE	PART #
1	1	X1	3.58 MHZ	3.58 MHz Crystal	Jameco	CY3.57
2	3	C1,C2,C8	10MF	10 MF 25V Tantalum	Digi-Key	P2049
3	4	C3,C4,C5,C6	1MF	1uf/50v Bi-Polar	Digi-Key	P1132
4	4	C7,C9,C10,C49	.1MF	.1 MF 50V Met. Film	Digi-Key	P4525
5	2	C11,C12	22PF	22 PF Disc Capacitor	Digi-Key	P4016
6	2	C13,C14	.001MFM	.001 MF Mylar	Digi-Key	P3102
7	2	C15,C16	.01MFM	.01 MF Mylar	Digi-Key	P3103
8	32	C17,C18,C19-49	.01MFD	.01 MF 50V Disc	Digi-Key	P4300
9	1	RP1	7X10K	10K/7 Element Network	Digi-Key	07103
10	1	RP2	9X10K	10K/9 Element Network	Digi-Key	09103
11	2	R1,R4	36K	1/4 Watt 5% Resistor	Digi-Key	36KQ
12	2	R2,R3	22K	1/4 Watt 5% Resistor	Digi-Key	22KQ
13	1	R5	470	1/4 Watt 5% Resistor	Digi-Key	470Q
14	2	R6,R7	10K	1/4 Watt 5% Resistor	Digi-Key	10KQ
15	4	R8,R11,R19,R20	470K	1/4 Watt Resistor	Digi-Key	470KQ
16	2	R9,R12	100K	1/4 Watt 5% Resistor	Digi-Key	100KQ
17	4	R10,R13,R14,R16	220K	1/4 Watt 5% Resistor	Digi-Key	220KQ
18	1	R15	100	1/4 Watt 5% Resistor	Digi-Key	100Q
19	1	R17	100KT	100K/15 turn Trimmer	Digi-Key	01B15
20	1	R18	3300	1/4 Watt 5% Resistor	Digi-Key	3.3KQ
21	8	D1-8	1N914	Switching Diode	Jameco	1N4148
22	1	Q1	2N2222A	Transistor	Jameco	2N2222A
23	2	K1,K2	DPDT	DPDT Relay	Same as in Amplifiers	
24	1	U1	8085	Microprocessor	Jameco	8085A
25	1	U2	74HC573	CMOS Octal Latch	Jameco	74HC573
26	3	U3A,U9A,U10A	ULN2803A	Octal Driver	Jameco	ULN2803B
27	3	U3B,U9B,U10B	UDN2981A	Octal Driver	Sprague	
28	1	U4	4018	CMOS Counter	Jameco	CD4018
29	1	U5	4049	CMOS Buffer/Inverter	Jameco	CD4049
30	1	U6	LM3900N	Operational Amplifier	Jameco	LM3900N
31	1	U7	2764	8K EPROM	Jameco	2764-45
32	1	U8	8156	RAM - I/O - TIMER	Jameco	8156
33	1	P1		26 pin Header Socket	Digi-Key	R304ND
34	1	J1		26 pin Header	Digi-Key	S23863-R
35	1	P2		6 pin Header Socket	Digi-Key	WM2004
36	1	J2		6 pin Hea		

Item	Quantity	Reference	Part	DESCRIPTION	SOURCE	PART #
1	1	U1	LM3900N	Operational Amplifier	Jameco	LM3900N
2	1	U2	4N32	Opto-Isolator	Digi-Key	4N32GE
3	1	U3	4011	CMOS Quad NAND Gate	Jameco	CD4011
4	1	U4	4049	CMOS Buffer/Inverter	Jameco	CD4049
5	3	U5,U6,U7	4094	CMOS 8 Bit Register	Jameco	CD4094
6	2	U8,U9	2803	Octal Driver	Jameco	ULN2803B
7	1	U10	4528	CMOS Multi-Vibrator	Jameco	CD4528
8	1	U11	TP5088	DTMF Encoder	Jameco	TP5088
9	1	U12	4053	CMOS Analog Switch	Jameco	CD4053
10	1	K1	DPDT	12 vdc DPDT Relay	Aromat	DS2E-M-DC12V
11	1	X1	3.58	3.58 MHz Crystal	Jameco	CY3.57
12	16	C1,C4,C5,C6,C7,C8,C9,C11, C12,C13,C14,C21,C22, C46,C8	.1MF	.1 MF 50V Met. Film	Digi-Key	P4525
13	3	C2,C10,C23	10MF	10 MF 25V Tantalum	Digi-Key	P2049
14	1	C3	.01MFM	.01 MF Poly.	Digi-Key	P3103
15	2	C15,C16	1MF	1uf/100v M.P. Cap.	Digi-Key	E1105
16	1	C17	1MFM	1 MF 35V Bi-Polar	Digi-Key	P1132
17	25	C18,C19,C20,C24-45	.01MFD	.01 MF 50V Disc(.25 Spc)	Digi-Key	P4300
18	3	R1,R4,R20	100K	100K 15 turn pot.	Digi-Key	01B15
19	1	R2	620/1W	1 Watt 5% Resistor	Digi-Key	620W-1
20	8	R3,R9,R10,R16,R17,R18, R19,R31	10K	1/4 Watt 5% Resistor	Digi-Key	10KQ
21	3	R5,R22,R28	220K	1/4 Watt 5% Resistor	Digi-Key	220KQ
22	4	R6,R7,R21,R23	3300	1/4 Watt 5% Resistor	Digi-Key	3.3KQ
23	1	R8	620	1/4 Watt 5% Resistor	Digi-Key	620Q
24	4	R11,R12,R14,R15	56K	1/4 Watt 5% Resistor	Digi-Key	56KQ
25	2	R13,R30	100K	1/4 Watt 5% Resistor	Digi-Key	100KQ
26	2	R24,R25	1M	1/4 Watt 5% Resistor	Digi-Key	1.0MQ
27	1	R26	47	1/4 Watt 5% Resistor	Digi-Key	47Q
28	1	R27	2200	1/4 Watt 5% Resistor	Digi-Key	2.2KQ
29	1	R29	6800	1/4 Watt 5% Resistor	Digi-Key	6.8KQ
30	1	R32	470	1/4 Watt 5% Resistor	Digi-Key	470Q
31	2	R33,R34	1000	1/4 Watt 5% Resistor	Digi-Key	1.0KQ
32	1	R35	100	1/4 Watt 5% Resistor	Digi-Key	100Q
33	1	RP1	6X10K	Resistor Pack (7)	Digi-Key	87103
34	10	D1,D3,D4,D5,D6,D7,D8,D9, D10,D11	1N914	Switching Diode	Jameco	1N4148
35	1	D2	DB103ND	Diode Bridge	Digi-Key	DB103ND
36	2	Q1,Q2	2N2222A	Transistor	Jameco	2N2222A
37	1	Q3	2N3904	Transistor	Jameco	2N3904
38	1	T1	TTPC-8	600/600 Transformer	Stancor	TTPC-8
39	3			14 pin IC socket		
40	6			16 pin IC socket		
41	2			18 pin IC socket		
42	1			6 pin IC socket		
43	2			9 pin jack	Digi-Key	WM4307
44	2			9 pin plug	Digi-Key	WM2007
45	20			Connector pins	Digi-Key	WM2200
46	1			Edge Connector	Digi-Key	S1364

NOTE: Please supply resistors and diodes with either STRAIGHT leads or with leads bent to .400" centers.

Item	Quantity	Reference	Part	DESCRIPTION	SOURCE	PART #
1	1	U1	LM3900N	Operational Amplifier	Jameco	LM3900N
2	1	U2	4N32	Opto-Isolator	Digi-Key	4N32GE
3	1	U3	4011	CMOS Quad NAND Gate	Jameco	CD4011
4	1	U4	4049	CMOS Buffer/Inverter	Jameco	CD4049
5	3	U5,U6,U7	4094	CMOS 8 Bit Register	Jameco	CD4094
6	2	U8,U9	2803	Octal Driver	Jameco	ULN2803B
7	1	U10	4528	CMOS Multi-Vibrator	Jameco	CD4528
8	1	U11	TP5088	DTMF Encoder	Jameco	TP5088
9	1	U12	4053	CMOS Analog Switch	Jameco	CD4053
10	1	K1	DPDT	12 vdc DPDT Relay	Aromat	DS2E-M
11	1	X1	3.58	3.58 MHz Crystal	Jameco	CY3.57
12	16	C1,C4,C5,C6,C7,C8,C9,C11, C12,C13,C14,C21,C22, C46,C8	.1MF	.1 MF 50V Met. Film	Digi-Key	P4525
13	3	C2,C10,C23	10MF	10 MF 25V Tantalum	Digi-Key	P2049
14	1	C3	.01MFM	.01 MF Poly.	Digi-Key	P3103
15	2	C15,C16	1MF	1uf/100v M.P. Cap.	Digi-Key	E1105
16	1	C17	1MFM	1 MF 35V Bi-Polar	Digi-Key	P1132
17	25	C18,C19,C20,C24-45	.01MFD	.01 MF 50V Disc(.25 Spc)	Digi-Key	P4300
18	3	R1,R4,R20	100K	100K 15 turn pot.	Digi-Key	01B15
19	1	R2	620/1W	1 Watt 5% Resistor	Digi-Key	620W-1
20	8	R3,R9,R10,R16,R17,R18, R19,R31	10K	1/4 Watt 5% Resistor	Digi-Key	10KQ
21	3	R5,R22,R28	220K	1/4 Watt 5% Resistor	Digi-Key	220KQ
22	4	R6,R7,R21,R23	3300	1/4 Watt 5% Resistor	Digi-Key	3.3KQ
23	1	R8	620	1/4 Watt 5% Resistor	Digi-Key	620Q
24	4	R11,R12,R14,R15	56K	1/4 Watt 5% Resistor	Digi-Key	56KQ
25	2	R13,R30	100K	1/4 Watt 5% Resistor	Digi-Key	100KQ
26	2	R24,R25	1M	1/4 Watt 5% Resistor	Digi-Key	1.0MQ
27	1	R26	47	1/4 Watt 5% Resistor	Digi-Key	47Q
28	1	R27	2200	1/4 Watt 5% Resistor	Digi-Key	2.2KQ
29	1	R29	6800	1/4 Watt 5% Resistor	Digi-Key	6.8KQ
30	1	R32	470	1/4 Watt 5% Resistor	Digi-Key	470Q
31	2	R33,R34	1000	1/4 Watt 5% Resistor	Digi-Key	1.0KQ
32	1	R35	100	1/4 Watt 5% Resistor	Digi-Key	100Q
33	1	RP1	6X10K	Resistor Pack (7)	Digi-Key	87103
34	10	D1,D3,D4,D5,D6,D7,D8,D9, D10,D11	1N914	Switching Diode	Jameco	1N4148
35	1	D2	DB103ND	Diode Bridge	Digi-Key	DB103ND
36	2	Q1,Q2	2N2222A	Transistor	Jameco	2N2222A
37	1	Q3	2N3904	Transistor	Jameco	2N3904
38	1	T1	TTPC-8	600/600 Transformer	Stancor	TTPC-8
39	3			14 pin IC socket		
40	6			16 pin IC socket		
41	2			18 pin IC socket		
42	1			6 pin IC socket		
43	2			9 pin jack	Digi-Key	WM4307
44	2			9 pin plug	Digi-Key	WM2007
45	20			Connector pins	Digi-Key	WM2200
46	1			Edge Connector	Digi-Key	S1364

NOTE: Please supply resistors and diodes with either STRAIGHT leads or with leads bent to .400" centers.

Item	Quantity	Reference	Part	DESCRIPTION	SOURCE	PART #
1	18	C1,C2,C3,C4,C11,C12,C14, C15,C17,C18,C20,C21,C23, C24,C32,C33,C34,C35	.1MF	.1 MF 50V Met. Film	Digi-Key	P4525
2	18	C5,C6,C7,C8,C13,C16,C19, C22,C25,C26	.01MFD	.01 MF 50V Disc	Digi-Key	P4300
3	3	C9,C10,C31	10MF	10 MF 25V Tantalum	Digi-Key	P2049
4	4	C27,C28,C29,C30	1MFB	1 MF 50V Bi-Polar	Digi-Key	P1132
5	6	D1,D2,D3,D4,D5,D6	1N914	Switching Diode	Jameco	1N4148
6	8	Q1,Q2,Q3,Q4,Q5,Q6,Q7,Q8	2N2222A	Transistor	Jameco	2N2222A
7	2	R1,R2	1M	1/4 Watt 5% Resistor	Digi-Key	1.0MQ
8	2	R4,R3	100	1/4 Watt 5% Resistor	Digi-Key	100Q
9	18	RN1,RN2,RN3,RN4,RN5, RN6,RN7,RN8,RN15,RN16	5X10K	5x10K Resistor Network	Digi-Key	05103
10	2	RN9,RN14	5X22K	5X22K Resistor Network	Digi-Key	05223
11	1	RN10	7X10K	7X10K Resistor Network	Digi-Key	07103
12	3	RN11,RN12,RN13	4X10K	4X10K Resistor Network	Digi-Key	04103
13	1	RN17	5X680	5X680 Resistor Network	Digi-Key	05681
14	2	U1,U12	LM3900N	Operational Amplifier	Jameco	LM3900N
15	1	U2	4049	CMOS Buffer/Inverter	Jameco	CD4049
16	8	U4,U5,U6,U7,U8,U9,U10, U11	4066	CMOS Analog Switch	Jameco	CD4066
17	1	U13	4528	CMOS Multi-Vibrator	Jameco	CD4528
18	2	U14,U15	4094	CMOS 8 Bit Register	Jameco	CD4094
19	18		14 pin IC socket			
20	4		16 pin IC socket			
21	1		36/72 pin Edge Connector			

NOTE: Please supply resistors and diodes with either STRAIGHT leads or leads bent on .400" centers.

RFC-8R8 REMOTE BASE INTERFACE
Size: B
Document Number:
Date: June 18, 1998
Sheet 1 of 1
REV: A

RFC 8-RC Repeater Controller Board

The RFC 8-RC Repeater Controller provides you with all the flexibility and expandability you'll need for your repeater. The single board controller provides for complete operation of your standard repeater, including your control link and remote base transceiver.

Four COS inputs provide for prioritized selection of the input signal, allowing local users to override link signals. With the optional RFC 8-RB Remote Base interface, you can have up to 8 remote base stations connected to your system, providing the ability to build complete network systems with just a few components.

The RFC 8-RC also has on-board CTCSS circuitry to eliminate interference from adjacent repeaters on the same frequency, or to provide limited access to the controllers programming. The RFC 8-RC has built in EEPROM memory for storing your favorite settings, eliminating the need for battery backup systems. The built-in watchdog timer samples the controller processor clock, and resets the controller should the processor lock up for any reason.

The optional Autopatch controller (RFC 8-AP) provides complete telephone autopatch interface, with programmable speed-dial numbers you can assign to your club members, emergency phone numbers, or even long distance access codes.

Security codes provide for three access levels, allowing you to provide limited access to the functions of the controller.

All programming is accomplished through the TouchTone™ pad on your standard transceiver, over the air, so you no longer need to take a computer to the site (or even make a trip to the site) to change the system operation. (Some programming requires a 16-key TouchTone™ pad.)

All of this on a 4.5 x 6.5 inch PC board which requires only 5VDC at 300 ma. And if this isn't enough, you get a full one-year warranty on parts and labor.

Suggested Retail $395.00

Features

- 4 COS Inputs
- 3 PTT Outputs
- 0.4 to 4 seconds Hang Delay Timer
- 0.5 to 3.0 minutes Timout Timer
- 10 to 30 wpm CW Speed
- 400 to 3000 Hz Tone Frequencies
- Remotely Programmable
- Data stored in non-volatile EEPROM
- 8-bit Expansion Port
- 1 Link Control
  (up to 8 with optional RFC 8-AP)
- 1 Remote Base Control
  (up to 8 with optional RFC 8-RB)
- 8085A Microprocessor
- Power: 5 VDC at 300 ma
- 4.5 inches x 6.5 inches
- Card Edge Connector
  (36/72 pin x .100 spacing)
- 1 year Warranty (parts and labor)

Options

- RFC 8-AP Autopatch
- RFC 8-RB Remote Base Interface

rfconcepts

Contact your favorite dealer

Inquiries
2000 Humboldt St., Reno, NV 89509
(702) 827-0133

Factory
1202 E. 23rd Street, Lawrence, KS 66046
(913) 842-7745

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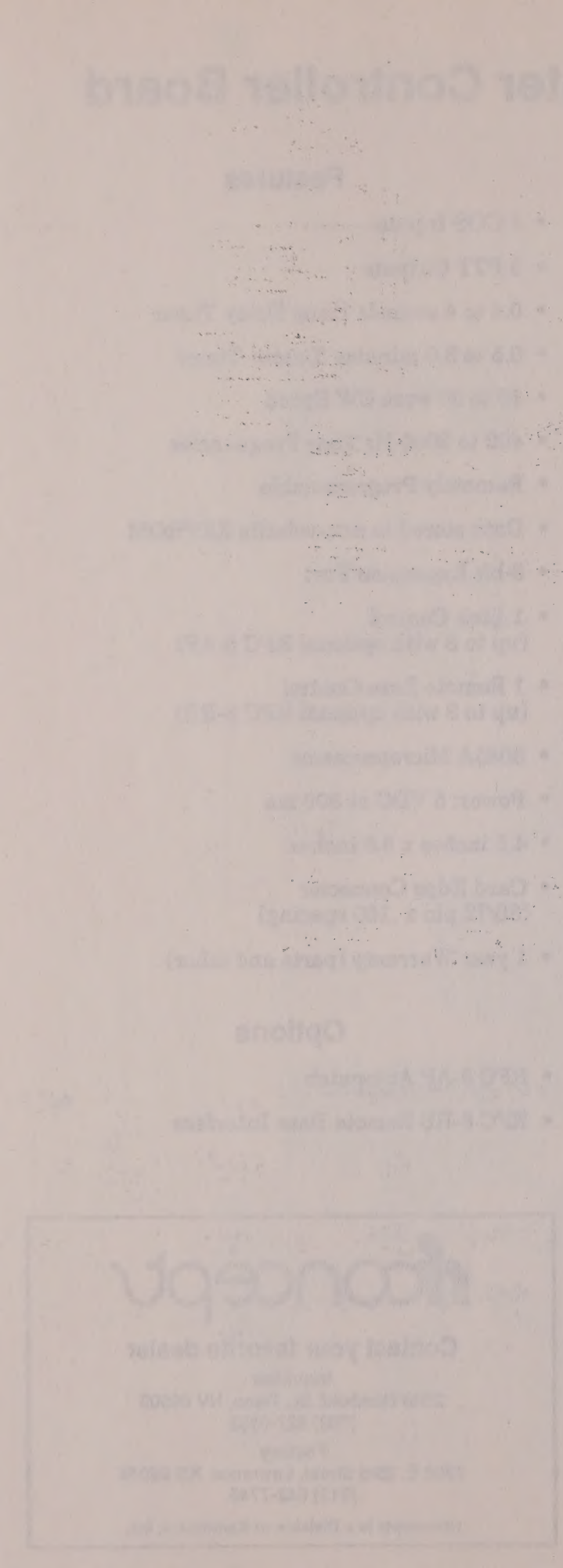
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